

Atomic Structure of Matter

Worksheet

8

1. A. Write the scientific term for each of the following :

1. An electrically neutral particle inside the nucleus of an atom. (.....)
2. The number of positively protons in the nucleus.
(Al-Ola Sch. / Cairo 2022, St. Joseph Sch. / Cairo 2020) (.....)
3. The fundamental building unit of matter. (Akhmaton Sch. / Cairo 2020) (.....)
4. The sum of the numbers of protons and neutrons in the nucleus. (.....)
(Al Bayan Sch. / Cairo 2023)

B. Write the symbol of each of the following elements :

Element	Its symbol	Element	Its symbol
1. Copper	9. Nitrogen	.....
2. Chlorine	10. Silicon	.....
3. Aluminium	11. Silver	.....
4. Carbon	12. Iron	.....
5. Mercury	13. Gold	.....
6. Calcium	14. Potassium	.....
7. Sodium	15. Lead	.....
8. Magnesium	16. Zinc	.....

2. Give reasons for :

1. The nucleus of an atom is positively charged.
(Manaret El-Eman Sch. / Cairo 2022, Sharm El-Sheikh Zone / South Sinai 2020)
.....
.....
2. The mass number is usually greater than the atomic number.
(Modern Normer Sch. / Giza 2022, Gharbia 2020)
.....
.....
3. The symbol of potassium is (K) not (Po) as it is expected.
.....
.....



3. A. If the mass number of sodium atom is 23 and its atomic number is 11, so :

1. The number of protons is
2. The number of neutrons is

B. What happens when the number of protons changes ?

(Sohag 2020)

.....

4. Mention the difference between :

1. Atomic number and mass number :

Atomic no.	Mass no.
.....
.....
.....
.....

2. Proton and electron :

Proton	Electron
.....
.....

Worksheet

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1. A. Give reasons for :

1. The electrons are distributed to fill (K) level before filling (L) level.

.....
 (West Mansoura Zone / Dakahlia 2020)

2. The mass of the atom is concentrated in the nucleus.

.....

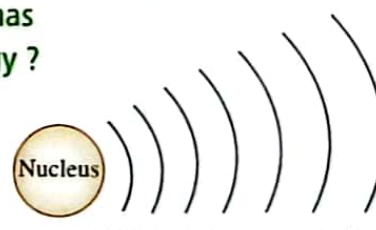
3. The atom is electrically neutral in its ordinary state.

(Dokki Zone / Giza 2023)

.....

B. Write the symbol under each energy level to arrange them according to their positions from the nucleus, then mention which of them has the least energy and which of them has the highest energy ?

1. level has the least energy.
2. level has the highest energy.



2. A. Complete the following statements :

1. The electrons revolve around the nucleus at very in a number of shells called
2. The maximum number of energy levels in the heaviest atoms is

B. Write the scientific term :

1. Negatively charged particles of negligible mass that revolve around the nucleus. (Tala'e almustakbal Sch. / Giza 2023) (.....)
2. The imaginary regions around the nucleus in which the electrons move according to their energies. (Lycee Bab El-Louk Sch. / Cairo 2020) (.....)
3. The amount of energy lost or gained by an electron when it transfers from one energy level to another. (Alfarouk Islamic Sch. / Cairo 2022, Ramses College Sch. / Cairo 2020) (.....)

3. What happens if ... ?

1. An electron gains a quantum of energy. (Dokki Zone / Giza 2023)
.....
2. The nucleus of an atom of an element doesn't contain neutrons.
.....
(St. Joseph Sch. / Cairo 2020)
3. An excited electron loses a quantum of energy. (Dream Sch. / Giza 2020)
.....

Worksheet 10**1. Complete the following table :**

(Al-Manar Sch. / Ismailia 2020)

Element symbol	Atomic no.	Mass no.	No. of protons	No. of electrons	No. of neutrons	Electronic configuration		
						K	L	M
$^{24}_{12}\text{Mg}$	.....	24	.....	12	.....	.....	.....	.....
$^{12}_6\text{C}$	6	12	6	.....	6	.....	.....	—
$^{35}_{17}\text{Cl}$	17	.....	17	17	.....	.....	.....	.....

2. A. Complete the following statements :

1. The energy level "M" is saturated with electrons, while the energy level (N) is saturated with electrons according to the rule ($2n^2$).

(Behira 2022, Al-Resala Sch. / Qalyoubia 2020)



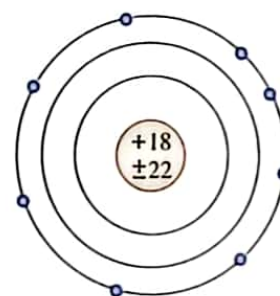
- The number of electrons which saturates the first four energy levels can be calculated from the relation
- The energy level "M" of aluminium atom ($^{27}_{13}\text{Al}$) contains electrons, while that of sulphur atom ($^{32}_{16}\text{S}$) contains electrons.

B. Give reasons for :

- Inert gases can't share in chemical reactions in ordinary state. (El-Agami Zone / Alex. 2020)
.....
- The rule ($2n^2$) is not applied on the energy levels greater than four. (Menofia 2023)
.....

3. A. The opposite figure represents the electronic structure of an atom. Find :

- The atomic number :
- The mass number :
- The number of electrons :
- The number of neutrons :



B. Rewrite the following statements after correcting the underlined words :

- Hydrogen is the only inert gas which contains two electrons in the outermost energy level.
.....
- Neon ($^{10}_{10}\text{Ne}$) is an active element, while nitrogen ($^{7}_{7}\text{N}$) is an inactive one.
.....

4. A. Study the following figures, then complete the following table :

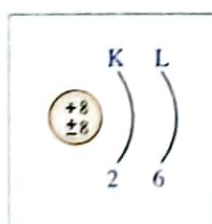


Fig. (A)

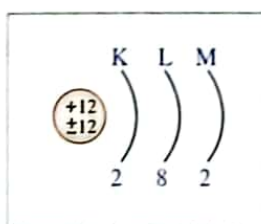


Fig. (B)

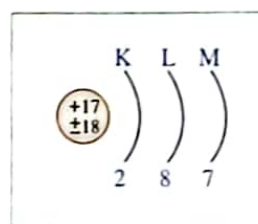


Fig. (C)

Element	Atomic no.	Mass no.	No. of electrons in the outer level	No. of energy levels having electrons
Fig. (A)
Fig. (B)
Fig. (C)

B. Compare between active elements and inactive elements :

Points of comparison	Active elements	Inactive elements
• The electrons in the outer level :
• Chemical activity :
• Examples :

5. A. An element, whose electrons are distributed in three energy levels, and its outermost energy level carries 3 electrons and its atom contains 14 neutrons.

Answer the following questions :

1. Show by drawing the electronic distribution of the atom of this element.

2. Calculate the atomic and mass numbers of the atom of this element.

.....

3. Is this element active or inert ?

.....

B. An atom of an element doesn't take part in any chemical reaction and its electrons are distributed in three energy levels and its atom contains 22 neutrons. Calculate :

1. Atomic number.

.....

.....

2. Mass number.

.....

.....

Worksheet 11

1. Complete the following :

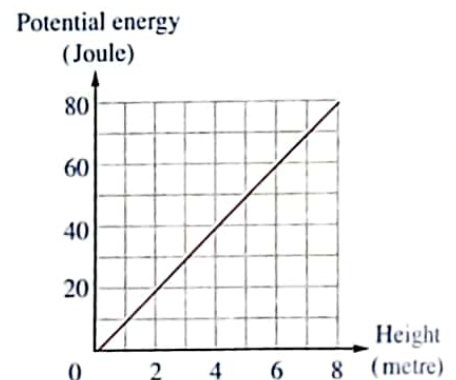
1. Work = ×
2. Mechanical, , and electric energies are from forms of energy.
3. , and are from resources of energy.
4. We obtain energy from loudspeakers and energy from solar cells.
5. The energy stored in stretched spring is , while that is produced from burning of wood is

2. A. Write the scientific term :

1. It is the ability to do work. (Dokki Zone / Giza 2023) (.....)
2. A form of energy stored in the food. (East Zone / Alex. 2020) (.....)

B. The graph shows the relation between the potential energy of an object and its height from the ground.

1. What is the potential energy at a height of 5 metres ?
.....
2. What is the decrease of the potential energy when the object falls from a height of 7 m. to 3 m. ?
.....
3. Calculate the body weight.
.....



3. A. Choose the correct answer :

1. Chemical energy is stored in the (Akhnaton Egyptian Sch. / Cairo 2020)
 - a. car battery.
 - b. car lamps.
 - c. stretched spring.
 - d. raising a load upwards.
2. The measuring unit of work is (El-Agamy Direct. / Alex. 2022)
 - a. metre.
 - b. Newton.
 - c. Joule.
 - d. kilogram.
3. is a permanent resource of energy.
 - a. Petrol
 - b. The Sun
 - c. Coal
 - d. Nuclear reaction

(Egypt Dream Sch. / Giza 2022, El-Sayda Zainb Zone / Cairo 2023)



4. When the height of an object is doubled, its

- kinetic energy will be doubled.
- mechanical energy will be four times its value.
- potential energy will be doubled.
- potential energy will be three times its value.

B. Give reasons for :

1. Some countries try to use the Sun, wind and the movement of water in generating electricity.

.....

2. No changes in the potential energy when the object moves horizontally.

(El-Salam Sch. / Luxor 2020)

.....

4. A. Problems :

1. What is the weight of a body, whose potential energy is 88 Joule and it is found at a height of 11 m. from the Earth's surface ? (Al-Mostaqbal Sch. / Aswan 2022, Sohag 2020)

.....

.....

2. If the work done to move a box a distance 5 metres equals 20 Joule.

Calculate the force.

(Dream Sch. / Giza 2020)

.....

B. From the opposite figures :

Which figure represents doing work ? Why ?

.....

.....

.....

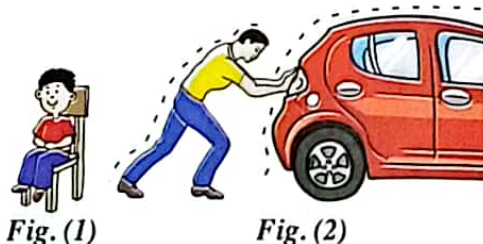


Fig. (1)

Fig. (2)

Worksheet

12

1. A. What is meant by ... ?

1. The kinetic energy of an object = 50 Joule.

(St. Joseph Sch. / Cairo 2022)

.....

2. The potential energy of an object = 30 Joule.

.....

3. The mechanical energy of an object = 100 Joule.

(Port Said 2020)

.....

B. Problems :

1. Calculate the mechanical energy of a body whose kinetic energy equals 1000 Joule and potential energy equals 500 Joule.
.....
.....
2. A ball was thrown up and when it reached 7 m., its speed was 8 m/sec. Calculate the potential energy, kinetic energy and the work done on it. If you know that the weight of the ball is 5 N. and its mass is 0.5 kg. *(Science Inspectorate / Dakahlia 2022)*
.....
.....
.....
.....

2. A. Choose the correct answer :

1. When an object is thrown upwards, its *(Lycee Bab El-Louk Sch. / Cairo 2020)*
 - a. speed increases gradually.
 - b. speed decreases gradually.
 - c. kinetic energy increases gradually.
 - d. potential energy decreases gradually.
2. An object of mass 2 kg. moves at a speed of 4 m/sec., its kinetic energy is *(Giza 2023)*
 - a. 16
 - b. 64
 - c. 32
 - d. 128

B. Put (✓) or (✗) :

1. The kinetic energy of a moving body is directly proportional to its mass. ()
2. Potential energy = $\frac{1}{2} \times \text{Mass} \times (\text{Speed})^2$ ()

3. What is the mathematical relation between ... ?

1. Displacement, work and force. *(Qus Official Sch. / Qena 2020)*
.....
2. Weight, potential energy and height.
.....
3. Kinetic energy, mass and speed.
.....
4. Kinetic energy, mechanical energy and potential energy. *(Qus Official Sch. / Qena 2020)*
.....



4. A. The opposite figure represents a falling of a ball from position (A) to position (C) through (B). Answer the following :

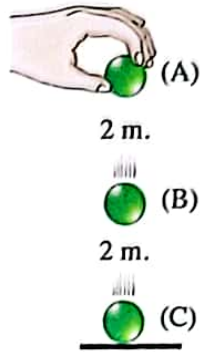
1. The potential energy is maximum at and it equals zero at
2. The kinetic energy is equal to potential energy at
3. The kinetic energy = at (A).
4. If the weight of the ball is 5 Newton, find its mechanical energy.

.....
.....

B. Give a reason for :

The kinetic energy will increase 4 times as the speed of the moving object is doubled.

.....



Worksheet 13

1. A. Complete the following statements :

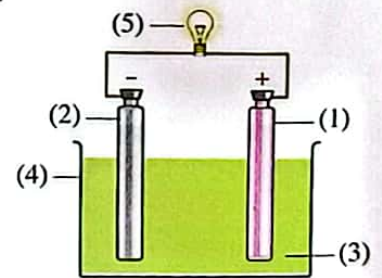
- In the simple electric cell, the energy changes into energy.
(Tala' Almustakbal Sch. / Cairo 2023)
- When you move the pendulum to the left, then release it, the energy changes into energy.
(Al Bayan Sch. / Cairo 2023)
- The positive pole in the simple electric cell is, while the negative pole is
(Egypt Dream Sch. / Giza 2022, Thebes Sch. / Giza 2020)
- When the speed of the pendulum is maximum, the energy is maximum, while energy is minimum.

B. From the opposite figure, answer the following questions :

- What is the name of the opposite device ? (Modern Narmar Sch. / Giza 2022, Alex. 2020)

2. Label the fig. :

- | | |
|-----------|-----------|
| (1) | (2) |
| (3) | (4) |
| (5) | |



- Mention the scientific idea of this device.

2. A. What happens ... ?

- When two plates made of copper and zinc are dipped in dilute sulphuric acid and are connected by a wire and a small lamp.
(Al-Ola Sch. / Cairo 2022)
- To the speed of the pendulum when you push it gently as shown in the figure.
(El-Gharbia 2020)



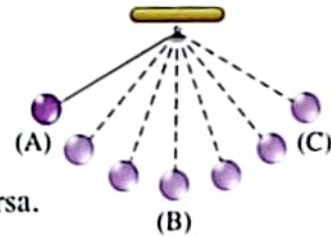
B. Choose the correct answer :

- The mechanical energy of the pendulum at the highest point equals

a. its kinetic energy only.	b. kinetic energy \times potential energy.
c. its potential energy only.	d. kinetic energy \div potential energy.



2. During moving a ball hanged in a thread as shown in the figure from left (A) to right (C), the
- kinetic energy changes into potential energy only.
 - potential energy changes into kinetic energy only.
 - potential energy changes into kinetic energy and vice versa.
 - kinetic energy changes into heat energy.

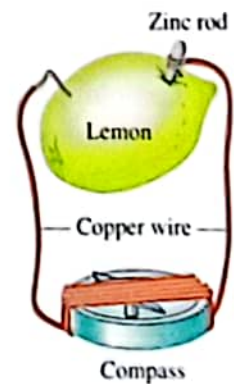


3. Problems :

- Someone kicked a ball of mass 0.5 kg. and weight 5 N. vertically upwards. At a height of 4 metres, its speed was 10 m/s. Calculate :
 - The potential energy at 4 metres.
.....
 - The work done on the ball at the starting point.
.....
 - The maximum height that the ball reached.
.....
- A ball is thrown vertically to reach 20 m. height. If the weight of the ball is 5 Newton, calculate its kinetic energy at :
 - The highest point :
 - The midpoint :

4. A. From the opposite figure :

- What happens to the compass ? Explain that.
.....
- What happens when a potato is used instead of the lemon ?
.....



B. Give a reason for :

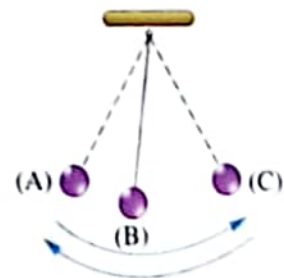
The motion of the children's swing is like that of the pendulum.

(El-Manahel Sch / Sohag 2022)

C. From the opposite figure, complete the following table :

[Knowing that the mechanical energy at point (A) = 150 Joule and K.E. at point (B) = 100 Joule].

Position	Kinetic energy	Potential energy
(A)
(B)
(C)



Worksheet 14

1. A. Give reasons for :

1. Some technological applications have negative effects.

(Beni Suef 2020)

2. Ecologists do not appreciate all the technological applications which are used in energy transformations.

(Samanoud Zone / El-Gharbia 2023)






B. Use the following tools to construct an alarm electric circuit (with drawing) for :

1. A deaf person.

2. A blind person.



2. Complete the following table :

The device	Energy used	Energy produced
1. 	Electric	.....
2.	.....	Sound
3. 	Electric	.....
4.	.....	Electric
5. 	Electric	.....

1. Complete the following :

1. The measuring unit of energy is, while that of weight is
2. The kinetic energy of a moving body depends on its and
(Ismailia 2023)
3. In electric bell energy is changed into energy.
4. When an object falls downwards, its energy converts into energy.

2. A. Choose the correct answer :

1. When you lift an object, you do work that is stored in the object in the form of
 - a. potential energy.
 - b. kinetic energy.
 - c. mechanical energy.
 - d. heat energy.
2. Kinetic energy of the object increases by
 - a. increasing the mass.
 - b. decreasing the weight.
 - c. increasing the height from the ground.
 - d. decreasing the mass.
3. The simple electric cell contains
 - a. dil.HCl
 - b. HNO₃
 - c. dil.H₂SO₄
 - d. NaCl

B. Give reasons for :

1. The work done to stop a moving car increases by increasing the mass of the car.
.....
.....
2. When we use a potato instead of the lemon in the simple electric cell, the needle of the compass deflects.



3. A. Put (✓) or (✗) :

1. Force = $\frac{\text{Work}}{\text{Displacement}}$ ()
2. The developed countries aim to use the energy produced from fuel. ()
3. We use an electric lamp as a tool for a deaf person. ()
4. Energy is created but not destroyed. (Menouf Directorate / Menofia 2022) ()
5. The potential energy of two identical objects at 5 m. height have different values. ()

B. What happens when ... ?

1. Combustion of food in the human body.
.....
.....
2. An object moves horizontally (concerning its potential energy).
.....
3. Overuse of chemical pesticides. (St. Joseph Sch. / Cairo 2020)
.....
.....

4. A. What is meant by the law of conservation of energy ?

(El-Kharga Directorate / New Valley 2022, El-Agami Zone / Alex. 2020)

.....

.....

B. Mention :

The factors affecting the potential energy.

.....

.....

November Tests

Model 1

Total mark

10

Question 1 5 marks

A Choose the correct answer :

- Heat is transferred through space by
a. convection only.
b. conduction only.
c. radiation only.
d. conduction and convection.
- Food and fuel are sources of energy.
a. chemical
b. mechanical
c. electric
d. sound
- In the car engine, the chemical energy changes into energy.
a. mechanical
b. light
c. electric
d. heat
- If the force decreases by half and the displacement is doubled, so the work
a. is double.
b. decreases to half.
c. doesn't change.
d. increases to four times.

B Give a reason for the following :

When two different metals connected with a compass are dipped in a lemon, the needle of the compass deflects.

.....

Question 2 5 marks

Put (✓) or (✗):

1. The simple electric cell consists of a sugary solution and two similar metals are dipped in it. ()
2. By raising a ball from the ground, its potential energy decreases. ()
3. The temperature of objects increases by increasing their speed. ()
4. The kinetic energy of a static object equals zero. ()

B What happens when ... ?

Two objects touch each other, one of them is hot and the other is cold.

.....



Model 2

Total mark

10

Question 1 5 marks

A Write the scientific term of each of the following :

1. Energy is neither created nor destroyed but it is converted from one form to another. (.....)
2. The work done during the motion of an object. (.....)
3. The transfer of heat from hot object to another without any need for a material medium through which heat transfers. (.....)
4. The measuring unit of energy. (.....)

B If a ball is thrown vertically to reach 20 m. height and its weight is 5 Newton. Calculate its potential energy at :

(1) The highest point.

(2) The ground

.....

.....

.....

Question 2 5 marks

A Put (✓) or (✗) :

1. When a stone falls down, its kinetic energy increases. ()
2. When the pendulum reaches the maximum height, its potential energy is zero. ()
3. The networks of wireless transmitters of cellular phones cause electromagnetic pollution. ()
4. In solar cells, the solar energy is converted into kinetic energy. ()

B Give a reason for the following :

When a moving object stops, its kinetic energy becomes zero.

.....

.....

.....

Test

1

Total mark

10

(5 marks)

Question 1

A Put (✓) or (X) :

- 1 The chemical symbol of sodium is (So). ()
- 2 The kinetic energy of a static object equals zero. ()
- 3 The speed of the pendulum increases as it goes away from the rest position. ()
- 4 Both magnesium ($_{12}\text{Mg}$) and sulphur ($_{16}\text{S}$) have the same number of electrons in the energy level "L". ()

B Give a reason for the following :

The car exhausts are considered from the negative effects of technological applications.

.....

.....

Question 2

(5 marks)

A Choose the correct answer :

- 1 Negative charged particles of negligible mass are
 (a) protons. (b) electrons. (c) neutrons. (d) molecules.
- 2 The second energy level in ($_{7}\text{N}$) atom contains electrons.
 (a) 5 (b) 6 (c) 7 (d) 3
- 3 Food and fuel are sources of energy.
 (a) sound (b) mechanical (c) electric (d) chemical
- 4 Electric energy is converted into kinetic energy in electric
 (a) lamp. (b) generator. (c) fan. (d) heater.

B What happens if ... ?

Falling an object from a high position (concerning its mass).

.....

.....

Test

2

Total mark

10

Question 1

(5 marks)

A Write the scientific term of each of the following :

- 1 The smallest unit of matter which can share in a chemical reaction. (.....)
- 2 The atom that gains a quantum of energy. (.....)
- 3 The product of multiplying the force by the displacement. (.....)
- 4 The pollution produced from the networks of wireless transmitters of cellular phones. (.....)

B What happens if ... ?

The moving pendulum strikes the rest one.

.....

.....

Question 2

(5 marks)

A Complete the following sentences :

- 1 The energy level that has the highest energy is, while level has the lowest energy.
- 2 Kinetic energy increases by increasing and of the object.
- 3 The positive pole in the simple electric cell is, while the negative pole is
- 4 In the nuclear reactor, energy changes into energy.

B Problem :

A moving pendulum has mechanical energy of 50 joule. Calculate its kinetic energy and potential energy at the highest point.

.....

.....

Answers of Test

1

Question 1

A 1 (x)

2 (✓)

3 (x)

4 (✓)

B Because they cause air pollution.

Question 2

A 1 (b)

2 (a)

3 (d)

4 (c)

B Its mass does not change.

Answers of Test

2

Question 1

A 1 Atom.

2 Excited atom.

3 Work done.

4 Electromagnetic pollution.

B The rest pendulum moves, while the moving pendulum stops.

Question 2

A 1 Q – K

2 mass – speed

3 copper – zinc.

4 nuclear – electric

B – Potential energy = mechanical energy = 50 joule.

– Kinetic energy = Zero.

E . P . S

Mr. Haitham said

Lesson Three:

Atomic structure of matter

Atom

The basic building unit of matter that cannot exist freely

• Properties of an Atom:

1. The atom cannot be found in a free state, but it combines with other atoms
2. Atoms of an element are similar, and differs from another element.

The chemical symbols of the important elements:

Element	Symbol	Element	Symbol	Element	Symbol
Hydrogen	${}^1\text{H}$	Neon	${}^{10}\text{Ne}$	Potassium	${}^{19}\text{K}$
Helium	${}^2\text{He}$	Sodium	${}^{11}\text{Na}$	Calcium	${}^{20}\text{Ca}$
Lithium	${}^3\text{Li}$	Magnesium	${}^{12}\text{Mg}$	Iron	Fe
Beryllium	${}^4\text{Be}$	Aluminum	${}^{13}\text{Al}$	Zinc	Zn
Boron	${}^5\text{B}$	Silicon	${}^{14}\text{Si}$	Copper	Cu
Carbon	${}^6\text{C}$	Phosphorus	${}^{15}\text{P}$	Gold	Au
Nitrogen	${}^7\text{N}$	Sulphur	${}^{16}\text{S}$	Silver	Ag
Oxygen	${}^8\text{O}$	Chlorine	${}^{17}\text{Cl}$	Iodine	I
Fluorine	${}^9\text{F}$	Argon	${}^{18}\text{Ar}$	Bromine	Br

Important Notes:

- In Chemical symbols the first letter always written in capital letters.
- Chemical symbols are taken from the Latin not the English name

Sodium	Natrium	Na
Potassium	Kalium	K
Copper	Cuprum	Cu

E . P . S

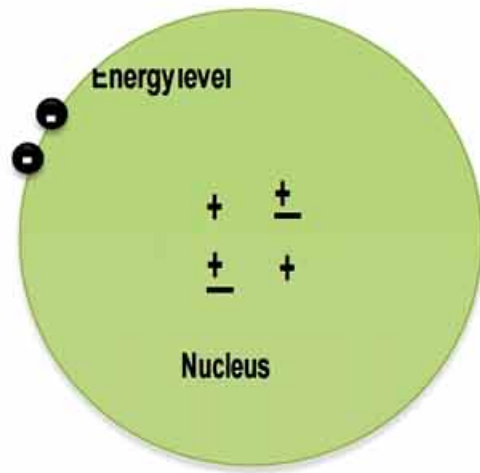
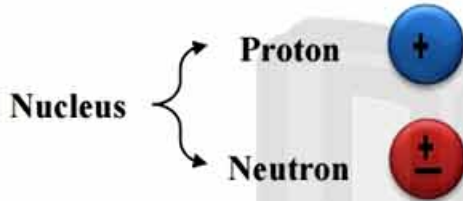
Mr. Haitham said

The structure of the atom:

It consists of:

- Nucleus
- Energy Levels

Energy Level → Electron

a) Nucleus:

- Exist in the center of the atom.
- The mass of the atom is concentrated in it (**Give Reason**)
Bec. It contains protons and neutrons
 - Protons:** positively charged particles. (+ve)
 - Neutrons:** electrically neutral particles (uncharged). (±ve)

b) Energy levels.

- Energy level:** The paths of the electrons around the nucleus
- They are 7 energy levels (K-L-M-N-O-P-Q)
- They differ in size, energy and their capacity.

Electrons:

- Are very minute particles.
- Negatively charged particles. (-ve)
- Orbit the nucleus in energy levels
- Electrons orbit around the nucleus but do not fall in it. (**Give Reason**)
Bec. They orbit with high speed and escape.
- The atom is electrically neutral (G.R)**
Bec. The number of electrons equals the number of protons

E . P . S

Mr. Haitham said

Comparing all the subatomic particles:

	Protons	Neutrons	Electrons
Position	In the nucleus	In the nucleus	Around the nucleus
Charge	Positive	Neutral	Negative
Mass	Greater than electron	Greater than electron	Extremely small [Can be neglected]

• The atom of each element is expressed by a chemical symbol:

- The mass number, written above the symbol from the left side.
- The atomic number, written below the symbol from the left side.

1. Atomic number:

- The number of protons in the nucleus.
- The number of electrons around the nucleus

2. Mass number:

- It is the sum of the numbers of protons & neutrons in the nucleus.

$$\text{Na Protons} = 11$$

$$\text{Na Electrons} = 11$$

$$\text{Na Neutrons} = 23 - 11 = 12$$

E . P . S

Mr. Haitham said

Science Activity

How to calculate the number of protons, electrons and neutrons:

Chlorine, $^{35}_{17}\text{Cl}$ Protons = 17
 Electrons = 17
 Neutrons = 18

Magnesium, $^{24}_{12}\text{Mg}$ Protons = -----
 Electrons = -----
 Neutrons = -----

Hydrogen, ^1_1H Protons = -----
 Electrons = -----
 Neutrons = -----

How to calculate the mass number and atomic number:

1. If the nucleus of Oxygen atom contains 8 protons and neutrons. Find the atomic number and the mass number of Oxygen

- The atomic number = no. of protons = -----
- The mass number = no. of protons + no. of neutrons =
 = ----- + ----- = -----

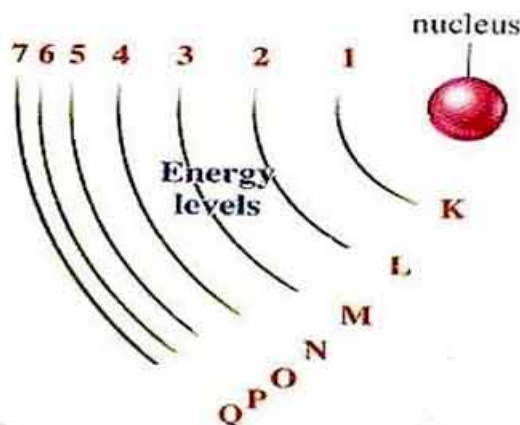
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Energy levels:

The orbits of electrons around the nucleus

- The energy level differs in energy.
- Energy of electron = Energy of level
- The energy increase away of the nucleus
- They are 7 main energy levels

**The Rule:** $2n^2$ where, (n) is number of the energy level

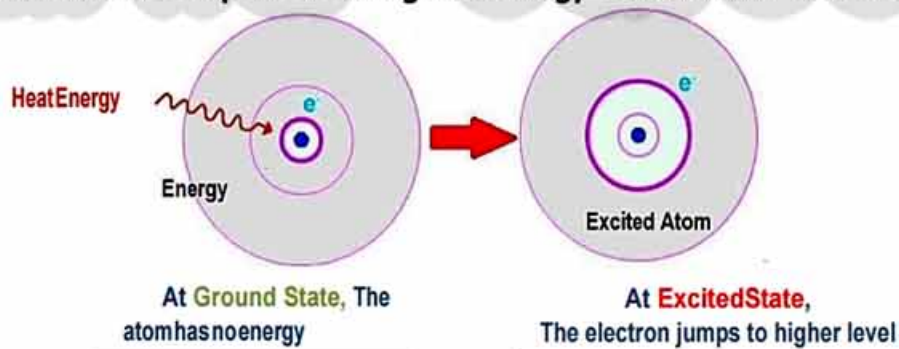
How to know the number of electrons that saturate the energy level:

This rule works only with the first four energy levels. (G.R)

- Because the atom will be unstable.
- 1. In the first energy level (K) = $2(1)^2 = 2 \times 1 = 2$ electrons
- 2. In the second energy level (L) = $2(2)^2 = 2 \times 4 = 8$ electrons
- 3. In the third energy level (M) = $2(3)^2 = 2 \times 9 = 18$ electrons
- 4. In the fourth energy level (N) = $2(4)^2 = 2 \times 16 = 32$ electrons

Important Note:

When an element heats up its atoms gains energy and become more excited



- **Excited atom:** The atom that gains a quantum of energy.
- **Quantum:** Amount of energy lost or gained by the electron

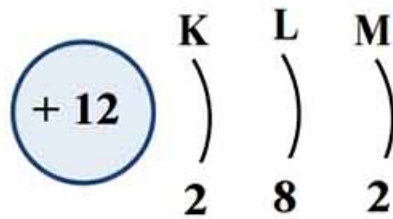
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Science Activity

The electronic configuration

Magnesium, 12Mg



Why the energy level K filled before L?

- Bec. The K level has lower energy than L level

Complete the following like the previous example by the help of figures:

Oxygen, 8O



Chlorine, 17Cl



Neon, 10Ne

Sodium, 11Na

Calcium, 20Ca

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The electronic configuration & chemical activity

The number of electrons in the outermost energy level determines the activity of the atom

1. If the number of electrons in the outermost energy level is less than 8 electrons, the atom becomes unstable (active), So they do chemical reaction.

Example of, active elements

Element	Symbol	Electronic configuration		
		K	L	M
Sodium	$_{11}\text{Na}$	2	8	1
Magnesium	$_{12}\text{Mg}$	2	8	2
Aluminum	$_{13}\text{Al}$	2	8	3
Element	Symbol	Electronic configuration		
		K	L	M
Phosphorus	$_{15}\text{P}$	2	8	5
Sulphur	$_{16}\text{S}$	2	8	6
Chlorine	$_{17}\text{Cl}$	2	8	7

2. If the number of electrons in the outermost energy level equals 8 electrons, the atom becomes (inactive), So they do not do chemical reaction.

Example of, inactive (noble) elements

Element	Symbol	Electronic configuration		
		K	L	M
Helium	$_2\text{He}$	2	-	-
Neon	$_{10}\text{Ne}$	2	8	-
Argon	$_{18}\text{Ar}$	2	8	8

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Lesson Review

Q1: Complete the following:

1. Atom can't be found in a ----- state
2. Atoms of element are -----, while Atoms of compounds are -----
3. The atom contains of -----, ----- and -----
4. The mass of the atom concentrated in -----
5. The ----- are positively charged, while the ----- are negatively charged
6. The electrons revolve around the nucleus in paths called -----
7. Atomic number is the number of ----- in the nucleus or the number of ----- around the nucleus.
8. Mass number of the number of ----- and -----
9. The rule ----- tells the numbers of the electrons fill the energy level
10. The 2nd energy level satisfied by ----- electrons.
11. Exited atom is the atom that gains -----
12. The quantum is the amount of ----- lost or gained by an ----- when it transfer from an energy level to another.
13. If the number of electrons in the outermost energy level is equal to 8, the atom becomes -----
14. If the number of the electrons in the outermost energy level is less than 8 electrons, the atom becomes -----

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Q2: Write the chemical symbol or the chemical Name:

Write the chemical symbol	Write the chemical Name
Sodium	Hg
Iron	Ag
Magnesium	He
Bromine	Cl
Nitrogen	Zn
Calcium	H
Iron	C
Oxygen	S
Potassium	Ar
Copper	Ne

Q3: Calculate the following:

1. If the nucleus of Sodium atom contains 11 protons and neutrons, find the atomic number and the mass number of Sodium

.....

.....

.....

2. If the nucleus of Calcium atom contains 20 protons and the mass number is 40, find the atomic number and the number of neutrons

.....

.....

.....

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Q4: What is meant by?

1. The atomic number of Oxygen is 8

.....

.....

2. The mass number of Oxygen 16

.....

.....

Q5: Give reason for each of the following:

1. The mass of the atom is concentrated in the nucleus.

.....

.....

2. The atom is electrically neutral.

.....

.....

3. The nucleus is positively charged.

.....

.....

4. The rule $2n^2$ cannot be applied for the fifth energy level.

.....

.....

5. Some elements do chemical reaction.

.....

.....

6. Some elements are mono-atomic (never do chemical reaction).

.....

.....

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Q6: Write the electronic Configuration for the following elements:

1. (${}^7\text{N}$)2. (${}^{19}\text{K}$)3. (${}^{17}\text{Cl}$)4. (${}^{13}\text{Al}$)5. (${}^{18}\text{Ar}$)6. (${}^3\text{Li}$)7. (${}^6\text{C}$)

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Lesson one:

Energy Resources

Energy.

The ability to do work.

- The fuel inside the engine burns and give the energy to move the car.
- The food inside our cells and produce the energy needed to do activities.

The fuel in the car is similar to the food in the body. (Give Reason)

Because both burn and produce, energy needed for work.

Work:

The force acts on a body and moves it for a distance in a certain direction.

$$\begin{array}{ccccc} \text{Work (W)} & = & \text{Force (F)} & \times & \text{Displacement (D)} \\ & & \text{(Joule)} & & \text{(Newton)} & & \text{(Meter)} \end{array}$$

Examples:

- A car moved for a distance 20 Meters pulling a piece of wood by a force of 75 Newton, Calculate the work done by this car.

$$\begin{aligned} - W &= F \times D \\ &= 75 \times 20 = 1500 \text{ Joule.} \end{aligned}$$

- A car moved for a distance 30 Meters pulling a piece of wood by a force of 20 Newton, Calculate the work done by this car.

$$\begin{aligned} - W &= \text{-----} \times \text{-----} \\ &= \text{-----} \times \text{-----} = \text{-----} \text{ Joule.} \end{aligned}$$

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Forms of Energy:**1. Mechanical Energy:**

(P.E + K.E) the energy stored in stretched spring.

2. Electric Energy:

The energy produced from an electric generator.

3. Sound Energy:

The energy produced by music player.

4. Light Energy:

The energy produced by from the light bulb or the candle.

5. Chemical Energy:

The energy stored in the car battery or the food.

6. Heat Energy:

The energy produced from the heater or the stove.

7. Nuclear Energy:

The energy produced from the nucleus of the atom.

Resources of the Energy:**1. Permanent sources of energy (sun only)****2. Renewable sources of energy. (Wind, Waterfalls, Tide and ebb)****3. Non-renewable Sources of energy.**

- The fuel (oil, Coal, natural gas)
- The food (chemical reactions)
- Nuclear Reactions (The reactions in the nucleus of the atom)

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- Some countries try to use the wind, energy to generate electricity (G.R)
Because they are cheap and clean

لا تنس الاشتراك في
قنوات ذاكرولي
على تطبيق التليجرام

تابع جديد ذاكرولي على
فيسبوك
تويتر
وانس اب
تليجرام

اكتب ذاكرولي في البحث وانضم لجروبات ذاكرولي
مع رياض الأطفال للصف الثالث الاعدادي

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The Mechanical Energy:**Mechanical energy:**

It is the summation of potential and kinetic energy.

$$\bullet \text{ The work done} = \text{The Mechanical energy} \\ = P.E + K.E$$

- **Potential energy** (when you raise a ball from the ground)- **Kinetic energy** (when you leave the ball to fall down).**Potential Energy**

It is the stored energy in the object due its position.

The factors affecting the potential energy:

1. The weight of the object. (P.E directly proportional to w)
2. The height of the object. (P.E directly proportional to h)

$$\text{Potential Energy} = \text{Height (h)} \times \text{Weight (w).}$$

(P.E)

Joule

Meter

Newton

Kinetic Energy:

- It is the energy of the object due to its motion.

The factors affecting the kinetic energy:

1. The mass of the object. (K.E directly proportional to m)
2. The velocity of the object. (K.E directly proportional to V)

$$\text{Kinetic Energy (K.E)} = \frac{1}{2} \text{ Mass (m)} \times \text{Velocity}^2 (V^2)$$

Joule

Kg

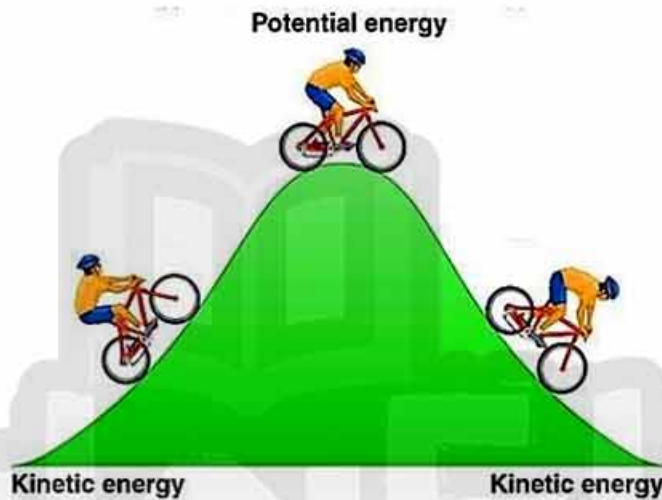
m/s

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Important Note

- Each body has a constant value of mechanical energy
- Mechanical energy is directly to the potential and kinetic energy
- Potential energy is inversely proportional to the kinetic energy



- **At the highest point**, the object has only potential energy.
- **At the middle point**, the object has potential energy = kinetic energy
- **At the ground**, the object has only kinetic energy. [max. speed]

Give reason:

1. **An object moves horizontally has a constant potential energy.**
Because the height does not change
2. **The potential energy of an object increases when the height increases.**
Because the potential energy is directly proportional with the height
3. **The kinetic energy of an object increases when the velocity increases.**
Because the kinetic energy is directly proportional with the velocity

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Problem:

1. A stone has a mass of 0.4 K.g was thrown up and reached a height of 5 m, then its velocity was 4 m/sec. Calculate the following:

1. P.E

2. K.E

3. M.E (Work)

• Weight = $m \times 10 = 4 \text{ N}$

1. P.E = weight x height. = $4 \times 5 = 20 \text{ joule}$

2. K.E = $\frac{1}{2} \times \text{mass} \times \text{velocity}$ = $\frac{1}{2} \times 0.4 \times 4^2 = 3.2 \text{ joule.}$

3. [M.E] W = P.E + K.E = $20 + 3.2 = 23.2 \text{ joule.}$

Practice:

2. A stone has a mass of 5 K.g was thrown up and reached a height of 6 m, then its velocity was 4 m/sec. Calculate the following:

1. P.E

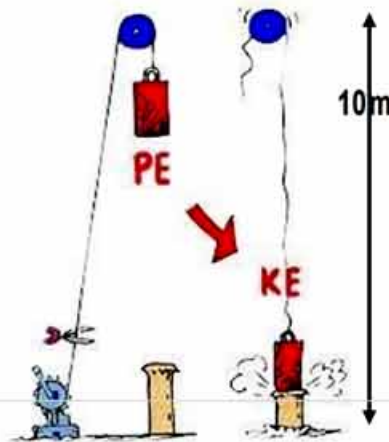
2. K.E

3. M.E (Work)

3. An iron cylinder was lift by a pulley to the maximum height. Calculate the following:

1. P.E when the object at the top

2. K.E when the object at the ground



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Lesson Review

Q1: Complete the following:

1. The ----- is the force acts on a body to move it for a distance
2. The measuring unit if Work is known as -----
3. The renewable resources of energy such as ----- while the non-renewable resources of energy such as -----
4. The factors affecting on the Work done to an object are ----- and -----
5. The factors that affecting the potential energy are ----- and -----
6. The potential energy is the energy ----- in an object at rest.
7. The factors affecting the kinetic energy are ----- and -----
8. The work-done for moving object equals -----
9. The potential energy is ----- Proportional to height of the object from the surface of the earth.
10. A kind of energy produced from the atomic reactions in the nucleus is known as -----
11. Each body has a constant value of ----- energy.
12. The kinetic energy is ----- Proportional to the velocity of the object.
13. The mechanical energy is the sum of ----- and -----
The energy stored in the food molecules is ----- energy
14. The energy used by plants in photosynthesis process ----- energy

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Q2: Give Reason for each of the following:

1. The food in the body is similar to the fuel in the car.

.....

.....

2. The renewable resources of energy are more common in use.

.....

.....

3. The potential energy of an object moves horizontally does not change.

.....

.....

4. The potential energy of an object increases when the height increases.

.....

.....

5. The kinetic energy of an object increases when the velocity increases.

.....

.....

Q3: what happens for each of the following?

1. An object moves horizontally (regarding the P.E)

.....

.....

2. An object moves with increasing speed (regarding the K.E)

.....

.....

Q4: Match.

-----	Potential Energy	1. $\frac{1}{2} mv^2$
-----	Kinetic Energy	2. $F \times d$
-----	Mechanical energy	3. $m \times g \times h$
-----	Work	4. $P.E + K.E$

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Q5: Problems

1. Find the potential energy if the mass body (20 kg), height (10m) and gravity (10 m/sec²)

2. Find the kinetic energy if the mass of the body is (5 kg), height (5m) and gravity (10 m/sec²)

3. Find the mechanical energy if potential energy (20 Joule) and kinetic energy (30 Joule)?

4. An iron cylinder with a weight of 60 N, was lift up ward, then find

- a) At the top

1. P.E

2. K.E

3. M.E

- b) At the middle

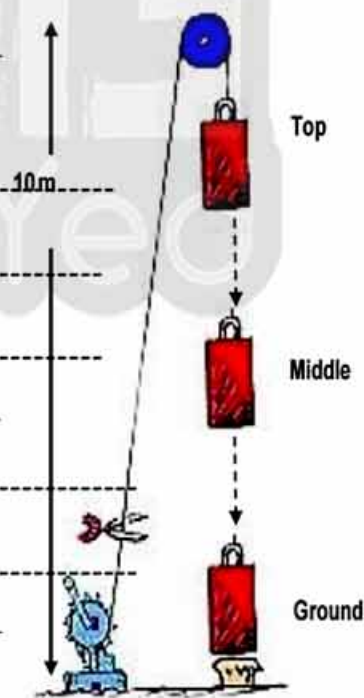
1. P.E

2. K.E

- c) At the ground

1. P.E

2. K.E



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Lesson Two

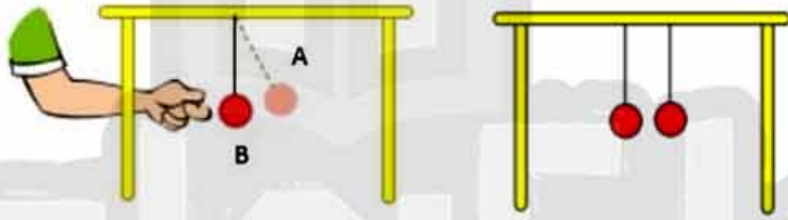
Energy Transformation

- The energy changes from one type to another, without losing any of its value.

Science Activity

Observation:

- What happens when you flick the pendulum?



Put ✓ in front of the correct one

The potential energy reaches maximum at

The kinetic energy reaches maximum at

A

B

Do you think it is ✓ or X

The 2 balls raise up to the same height

The mechanical energy of the 2 balls are the same

Conclusion:

- The P.E and K.E changes but the mechanical energy is the same

The conservation law of Mechanical Energy:

- The sum of potential and kinetic energy of an object is the same.

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Science Activity

Observation:

- What happens when you turn on the following devices?

Put ✓ in front of the correct one

	Heat	Light	Sound
The electric Lamp converts electric energy to			
The electric Heater converts electric energy to			
The electric speaker converts electric energy to			

Conclusion:

- The same kind of energy changes into different types of energy
- Energy never created nor destroyed

The conservation law of Energy:

- Energy neither created nor destroyed, but it converted from one type to another.

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Examples of Energy Transformation

The process	Energy used	Energy produced
On winding a spring toy	Kinetic	Potential
On leaving the spring free	Potential	Kinetic
Rubbing your hands	Kinetic	Heat
Hammering an iron piece	Kinetic	Heat & Sound
Metallic bell (school bell)	Kinetic	Sound
Electric heater, fire.	Electric	Heat
Electric fan	Electric	Kinetic
Electric lamp or bulb	Electric	Light
Battery (dry cells)	Chemical	Electric
Torch	Chemical	Electric → light
Running	Chemical	Heat → kinetic
Photosynthesis	Light	Chemical

Energy Transformation inside the car:

Car Engine	Chemical → Thermal → Mechanical
Car Dynamo	Kinetic → Electric
Car lamps	Electric → Light
Car air conditioner	Electric → Heat
Car Radio	Electric → Sound

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Technological Applications of Energy Transformation:

Application	Energy changes
Sewing Machine	Electric energy into mechanical energy.
Solar Cells	Solar energy into electric energy.
A cellular Phone	Electromagnetic energy waves into sound energy.
Alarm Clock	Chemical energy into kinetic and sound energy.
Television	Electric energy into light and sound energy.

The negative effects of technology:

1. Environmental Pollution.
2. Harming human's life.
3. Bad use of Human in Wars and destruction.

Examples of the negative effect of the technological applications:

Application	Negative Effect	Disease
Car Exhaust	Air pollution	Chest and eye diseases.
Military Explosions	Huge destruction	Diseases leads to death.
Chemical Pesticides	Water, air, and soil pollution	Cancer.
Nuclear Weapons	Huge destruction.	Diseases leads to death.
Mobile Webs	Electromagnetic pollution	Heart diseases.

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Lesson Review

Q1: Complete the following:

1. The energy never ----- nor ----- but, it is only converted from one type to another.
2. The car engine converts the energy from ----- to -----
3. The cell phone converts the energy from ----- to -----
4. The energy is converted from ----- to ----- In the sewing machine.
5. The energy is converted from ----- to ----- During running
6. In the photosynthesis process the energy converted from ----- to -----
7. The chemical pesticides cause ----- disease.
8. car exhausts and air pollution cause ----- disease
9. the electromagnetic pollution cause ----- disease
10. the chemical pesticides cause ----- disease

Q2: Give reason for each of the following:

1. The energy never lost nor gained.

2. Cars have negative effect on the environment and the man.

3. The chemical pesticides have negative effect on man health.

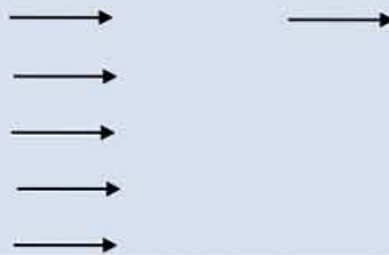
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Q3: Complete the following:

The process	Energy used	Energy produced
On winding a spring toy		
On leaving the spring free		
Rubbing your hands		
Hammering an iron piece		
Metallic bell (school bell)		
Electric heater, fire.		
Electric fan		
Electric lamp or bulb		
Battery (dry cells)		
Torch		
Running		
Photosynthesis		

Car Engine
Car Dynamo
Car lamps
Car air conditioner
Car Radio



Work sheet (3)

Lesson (3)

Complete the following :-

- 1- The symbol of sodium atom is, while that of sulphur atom is
- 2- The mass number is the sum of number and, which exist in the nucleus .
- 3- Electron are particles with charges , while proton are particles with charges .
- 4- The second energy level (L) is saturated with , while the fourth one (N) is saturated with electron
- 5-Active element should have than 8 electron in outermost energy level .

Write the scientific term :-

- 1- The fundamental building unit of matter that can take part in the chemical reaction . ()
- 2- The number of positive proton in the nucleus . ()
- 3- The sum of the number of proton and neutrons in the nucleus . ()
- 4- The number of negative electron that rotate around the nucleus . ()
- 5- Negatively charged particles of negligible mass that revolve around the nucleus . ()
- 6- Imaginary places around the nucleus in which the electron move according their energy . ()

7- The amount of energy lost or gained when an electron transfer from one energy level to another . ()

What is meant by :-

The atom :-

Atomic number :-

Write the symbol :-

- 1- Sodium
- 2- Potassium
- 3- Calcium
- 4- Chlorine
- 5- Nitrogen
- 6- Aluminum

Write the name of the element :-

- 1- H
- 2- He
- 3- Au
- 4- Ag
- 5- Pb
- 6- S

Work sheetLesson 1 unit 2

Give reason for:

1. The K.E at maximum height equal zero.

2. Two cars of mass 5 kg and 15 kg respectively are moving with the same velocity which one has the highest K.E?

Problems

2- A body of mass 2 kg. falls freely from rest from a distance 40 m height by a speed = 5 m/sec

Knowing That $g = 10 \text{ m/s}^2$.

Calculate K.E and P.E

Calculate the K.E of a car moves with velocity 10 m / s if it mass is 900 kg ?

Work sheetLesson 2**. Write the scientific term:**

1. It is used to convert the mechanical energy into to electrical energy.
[.....]
2. It is composed of an acid solution with two different metals dipped in.
[.....]
3. Energy is neither created nor destroyed but it changed from one form to another.
[.....]

- Complete:

1. In the electric lamp energy is converted into energy.
2. On leaving the pendulum to move freely energy is converted to and
this confirm the law of
3. from the technological application that causes air pollution.
4. Electric energy is changed into energy in the electric bell
5. Friction converts energy to energy.
6. The Lemon contains solution.

Atomic structure of matter

Class work sheet

Complete

1. The symbol of sodium atom is, while the symbol of sulphur atom is.....
2. The atom consists of two main parts which areand.....
3. (Au) is the symbol ofelement, while (Ag) is the symbol ofelement
4. Electrons are particles with..... charges, while protons are particles with.....charges
5. If the mass number of an element is 35 and it has 18 neutrons in its nucleus, therefore the number of electrons is.....and its atomic number is.....
6. The number of neutrons=.....
7. The energy level that has the highest energy is....., whilelevel has the lowest
8. The outermost energy level of chlorine atom (*Cl*) containselectrons so, it is considered fromelements
9. Noble gases have 8 electrons in the outermost energy level except.....which haselectrons
- 10.Active elements should havethan 8 electrons in their outermost energy level

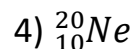
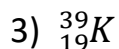
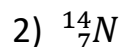
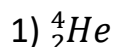
Write the scientific term:

1. The fundamental building unit of matter that can take part in the chemical reaction (.....)
2. Positively charged particles in the nucleus of an atom (.....)
3. Negatively charged particles of negligible mass that revolve around nucleus (.....)
4. The atom that gains a quantum of energy (.....)

Write the names of the elements of the following symbols :

- H
- Si
- 2) I
- 5) Cu
- 3) O
- 6) Fe

Write the electronic configuration for the following atoms:



Problem:

If you know that the symbol of chlorine atom is (${}^{35}_{17}\text{Cl}$)

- a) **Calculate** the atomic number, mass number and no. of neutrons
- b) **Write** the electronic configuration of the atom

.....
.....
.....

Give reason

1. The nucleus of an atom is positively charged

.....

2. The mass of the atom is concentrated in the nucleus

.....

- 3) The rule $2n^2$ is not applied on energy level greater than 4

.....

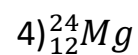
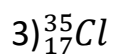
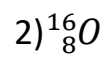
- 4) Atoms of active element take part in the chemical reaction

.....

4. Sodium atom is active, while argon is inactive

.....

Write the electronic configuration for the following:



Energy Resources and forms

Class work sheet

Complete

- 1)is the ability to do work and its measuring unit is.....
- 2) Resource of permanent energy is
- 3)energy can be stored in car battery
- 4) An object of mass 2kg. is moving at a speed 4m/sec.has a kinetic energy of.....
- 5) Potential energy =.....x.....
- 6) Mass is determined byunit, while the weight is determined byunit
- 7) Kinetic energy increases by increasingand.....of the object
- 8) Weight of object =
- 9) When a body is raised up, the potential energy, while the kinetic energy.....
- 10) If the P.E of an object is 100 joules and its kinetic energy is 50 joules, its mechanical energy is

What is meant by:

1. Potential energy of an object is 30 joule
.....
2. Kinetic energy of an object is 20 joule
.....
3. Mechanical energy of an object is 100 joule
.....

Write the scientific term:

1. The ability to do work or to make a change (.....)
2. The measuring unit of energy (.....)
3. The work done during motion of an object (.....)

Give reason:

1. When an object falls from up to down, its potential energy decreases
.....
.....

2. The value of K.E of an object can't be more than its mechanical energy

.....
.....

Problems:

1. If the work done to move a box to distance of 2 meters equals 40 joules.
Calculate force

.....
.....

2. Calculate the weight of an object, whose mass is 5 kg. if you know that
the acceleration due to gravity is $9.8m/sec^2$

.....

3. If a ball thrown vertically to reach 20 m. height and its weight is 5
newton .calculate its potential energy at:

a)the highest

point:.....

b)the ground:.....

4. Calculate the mechanical energy of a moving object if its kinetic energy
is 1000 joules and its potential energy is 500 joules.

.....

5. A ball was launched upwards vertically at a speed of 3 m/sec. up to
height 4 m. calculate the work done on the ball if its weight =5 newton,
and its mass is 0.5 kg

.....

.....

.....

Home work sheet

Choose:

1. Food and fuel are sources of Energy
a)Chemical b)mechanical c)sound d)electric
2. An object of mass 2kg. is moving at a speed of 4 m/sec. has K.E of.....
a)16 j b)64 j c)32 j d)128 j
3. When a speed of a moving object is doubled, its kinetic energy
a)not changed b)will be 4 times its value
c)will be doubled d) will be 3 times its value

4. Mechanical energy is the sum of Energies
 - a)heat and potential b)light and kinetic
 - c)kinetic and potential d)potential and light
5. As an object falls downwards.....
 - a)the potential energy icreases b)the kinetic energy increases
 - c)the mechanical energy is lost d)the speed of the object decreases

Write the scientific term:

1. The stored energy in an object due to work done on it (.....)
2. The sum of potential energy and kinetic energy of an object (.....)

What is meant by:

1. The stored energy in the object due to the work done on it =100 joules
.....
2. The kinetic energy of an object = 50 joules
.....

Give reason:

1. The person who pushes a car consumes energy
.....
.....
2. At the maximum height of ball, its mechanical energy is equal to its potential energy only.
.....
.....

Problems:

1. Find a weight of an object of potential energy 88 joule when it is found at a height 11 m
.....
.....

2. Calculate:

a) The potential energy of an object, whose weight is 10 newton. And placed at 5 m height from ground

.....
.....

b) The kinetic energy of an object, whose mass is 2 kg and moving at a speed of 5 m/sec

.....
.....

Energy transformations

Classwork sheet

Complete

1. When you move the pendulum to the left, then release it, the.....Energy changes intoEnergy
2. When pendulum goes away from its rest point to reach maximum height theEnergy is maximum and.....Energy is zero
3. The positive pole in the simple electric cell is while the negative pole is
4. The mechanical Energy of pendulum at the highest point equals
5. In cellular phone, theenergy changes toenergy
6. When you lift an object you do work stored in the object in the form of
7. In the solar cells, solar energy converted toenergy

Write the scientific term:

1. Energy is neither created nor destroyed, but it is converted from one form to another (.....)
2. The pollution produced from the networks of wireless transmitters of cellular phones (.....)

Give a reason:

1. Some technological applications have negative effects
.....
.....
2. The moving object keeps its mechanical Energy during motion constant
.....
.....
3. When pendulum reaches maximum point the kinetic Energy equals zero
.....
.....

Problems:

1. A moving pendulum has a potential energy of 0.8 joule at maximum displacement, if the mass of its ball is 0.08 kg. and acceleration due to gravity is 10 m/sec^2 Calculate:
 - a) the height of pendulum at maximum displacement
.....
.....
 - b) the kinetic energy of pendulum at such point
.....
.....
2. A pendulum, whose mass is 0.2 kg and its mechanical energy is 1.2 joule and its kinetic energy during its passing by the rest position is 0.9 joule Calculate :
 - 1) The potential energy of pendulum at the rest position
.....
.....
 - 2) The kinetic energy of pendulum at maximum point
.....
 - 3) The speed of pendulum at the moment of passing by the rest position
.....
.....
3. The mass of pendulum is 0.5 kg and its speed at rest point is 6 m/sec Calculate kinetic energy at maximum displacement
.....
.....
4. Someone kicked a ball of mass 0.5 kg and weight 5 N. At height of 4 meters its speed was 10 m/sec. Calculate
 - a) the potential energy at 4 meters
.....
 - b) The work done on the ball at the starting point
.....
.....
 - c) the maximum height that the ball reached
.....
.....

Homework sheet

Choose:

1. In cellular phone, the
 - a) Electric energy changes to mechanical energy
 - b) Light energy changes to heat energy
 - c) Electric energy to sound and light energies
 - d) Chemical energy changes to light energy
2. The motor converts the electric energy to.....energy
 - a) Magnetic
 - b) Chemical
 - c) Light
 - d) Kinetic
3. In the car engine, the chemical energy changes intoenergy at first
 - a) Heat
 - b) Electric
 - c) Mechanical
 - d) Light
4. Electric energy is converted to kinetic energy in
 - a) Electric lamp
 - b) Cellular phone
 - c) Electric fan
 - d) Electric bell

Complete:

1. The simple electric cell consists ofsolution is dipped in it 2 different
2. In the electric heater,.....energy changes toenergy
3.energy is changed into electric energy in the battery
4. When the pendulum goes away from its rest position to reach maximum height the.....energy is the maximum andenergy is zero
5. In simple electric cell, the electric current passes through the wire from.....plate to.....plate

Give a reason:

1. Using batteries in electric circuits
.....
.....
2. Car engine is important to the car
.....
.....

Problems:

1. A moving pendulum has mechanical energy of 40 joule. Calculate its kinetic energy and potential energy at highest point
.....
.....
2. A ball is thrown vertically to reach 20 meter height. If the weight of the ball is 5 Newton. Calculate its kinetic energy at
 - a) the highest point:.....
 - b) the midpoint :

Evaluation

Atomic Structure Of Matter

Q1

Complete the following statement

1. The Latin name of sodium isand its symbol is
2. The charge of protons isand they present inside the
4. The atomic no. = =
5. No. of energy levels arein the heaviest atom.
6. The energy of level "L" isthan levelbecause the energy of each level depends on
7. The mass of the atom is concentrated in
8. The no. of neutrons = -
9. The charge of the electrons iswhile the charge of atom is
10. The Latin name of Potassium isand its symbol is
11. The Latin name of iron is and its symbol is
12. As we go further from the nucleus, the energy of the level
13. When an electron near the nucleus move to a higher level, it a quantum and the atom become
14. The atomic number of an atom has 3 electrons in "M" level equals.....
15. The energy level "L" of carbon atom (${}_6\text{C}$) contains.....electrons , while that of Sulfur atom (${}_{16}\text{S}$) containselectrons.
16. When atomic number equals mass number. That means that there is no in this atom.

Q2

What happens if:

1. The no. of electrons changes in the atom.
.....
2. The electron loses energy.
.....
3. The electron gains energy.
.....
4. If the no. of electron in the last energy level is less than 8 e.
.....
5. The no. of electron in the last energy level = 8.
.....

Q3**Write the scientific term:**

1. The sum. of no. of protons and neutrons in the nucleus. (.....)
2. Positively charged particles exist inside the nucleus. (.....)
3. Imaginary regions in which electrons rotate. (.....)
4. The amount of energy lost or gained when the electron transfers from an energy level to another. (.....)
5. Elements have 8 electrons in their outermost energy level. (.....)

Q4**Answer the following :****A - Write the electronic configuration of each the following:**

1. $^{40}_{20}\text{Ca}$
2. ^4_2He
3. $^{39}_{19}\text{K}$

a. What is the name of each symbol?

.....

b. Determine the no. of protons, electrons and neutrons.

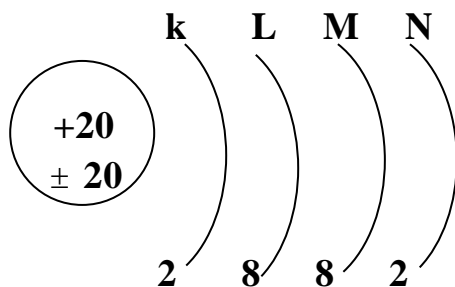
.....

c. Determine if the atom is active or not.

.....

B - An element(X) its atomic no. is 13 and its mass no. is 27

1. Determine the no. of neutrons.
2. Write the electronic configuration.

C - From the following figure find:

1. The atomic no.
- 2- The mass no.
- 3- No. of protons
- 4- No. of electrons
- 5- No. of neutrons

2. D - Write the electronic configuration of each the following:

1. ${}^7_3\text{Li}$ 2. ${}^1_1\text{H}$ 3. ${}^{35}_{17}\text{C}$

- a. What is the name of each symbol?
b. Determine the no. of protons, electrons and neutrons.
c. Determine if the atom is active or not.

E - An element Y has 7 electrons in the third energy level and its mass no. is 35 Determine:

No. of protons. No. of electrons. No. of neutrons.

Write its electronic configuration.

Determine if the atom is active or not.

F - Write the symbol of the following elements:

1. Iron.....2. Mercury.....3. Lead.....
4. Sulphur.....5. Silicon.....6. Bromine.....
7. Zinc.....8. Sodium.....9. Potassium.....

Q5

Give reasons for

1. The symbol of element may be represented in 2 letters.

.....

2. The atom is electrically neutral.

.....

3. The nucleus is +ve charged.

.....

- 4- The mass of the atom is concentrated at the nucleus.

.....

5. The there is a relation between no. of electrons and the chemical activity.

.....

6. Although the last energy level in Helium has 2 electrons it doesn't participate in any chemical reaction.

.....

H) An element Y has 7 electrons in the third energy level and its mass no. is 35

Determine:

No. of protons. No. of electrons. No. of neutrons.

Write its electronic configuration.

Determine if the atom is active or not.

Evaluation

Energy, Resources and forms

Q1 Complete the following statement

- 1- When a body is raised up ,the potential energy ,while the kinetic energy
- 2- When balls falls down ,.....energy changes into.....energy
- 3- At maximum height , the kinetic energy of the object equals
- 4- As the force is increased to double , the work done will
- 5- ,.....andare from the energy resource
- 6- Work = \times

Q2 Choose the correct answer

- 1-.....is a permanent source of energy
a) petrol b) the sun c) coal
- 2-Food and fuel are sources ofenergy.
a) chemical b) electric c) sound
- 3-When a body falls freely its
a) P.E decreases and K.E increase b) P.E and K.E increase.
c) P.E and K.E decrease
- 4- When a body is projected upward, the sum. of its P.E and K.E.....
a) increase b) decreases. c) remains constant d) equals
- 5-potential energy equals.....
a) weight \times height b) mass \times height c) no correct answer

Q3 Give reason for

1. The mechanical energy of the body is always constant.
.....
2. The potential energy on the ground = zero.
.....
- 3-The K.E at maximum height equal zero.
.....
- 4- No change in potential energy when the object moves horizontally.
.....

Q4**Problems**

a) An objects ,whose mass is 2 kg and it is at height of 5 cm from earth's surface calculate the potential energy .

.....

b) What is the weight of the body ,whose potential energy is 88 joules and it is at height of 11m?

.....

c) Calculate the K.E of a car moves with velocity 20 m / s if it mass is 900 kg

.....

d) Calculate the kinetic energy of a body its weight 48 N that moves with a speed 4 m/sec. knowing that the gravitational acceleration is 9.8 m/s^2 ?

.....

e) A body of mass 50 kg , calculate the height from the Earth's surface if its P.E at that height equals 2500 joule ($g = 10 \text{ m/s}^2$) .

.....

f) A body of weight 20N and its mass is 2 kg was thrown upward .

Height	Velocity	P.E	K.E	M.E
0 m	10	.....	100	.....
3.75	.....	.....	25 Joule	.....
.....	0	.....	.....	.....

Q5**What's meant by?**

1-Energy :

.....

2-Mechanical energy :

.....

Evaluation

Energy Transformations

Q1 What's meant by

- Energy conservation Law.

.....

Q2 Complete the following statement

1. In the electric lampenergy is converted intoenergy.
2. On leaving the pendulum to move freelyenergy is converted toand this confirm the law of
3. In the moving swing the sum. ofandenergies at any moment is
4. The Lemon containssolution.
5.from the technological application that causes air pollution.
6. Electric energy is changed intoenergy in the electric bell.

Q3 Give reason for

- 1-The pendulum, the kinetic energy of vibration body decrease when it goes away from its original position to its highest point .
.....
- 2- The movement of the compass needle when we put it nears to the simple cell.
.....
- 3-Car engine is important to the car.
.....

Q4 Write the scientific term

1. It is used to convert the mechanical energy into to electrical energy. [...]
2. It is composed of an acid solution with two different metals dipped in. [...]
3. Energy is neither created nor destroyed but it changed from one form to another [...]
4. The sum. of P.E and K.E of an object under the effect of gravity is constant. [...]
5. Instrument is used to convert the chemical energy into electrical energy. [...]

Unit 1

(Matter and its Construction)

Lesson 3 (Atomic Structure of Matter)

▪ **Choose the correct answer.**

1- The atom is electrically

- a. positive
- b. neutral
- c. negative

2- The fourth energy level is saturated by.....electrons.

- a. 32
- b. 18
- c. 8
- d. 2

3- The electron ischarged particle.

- a. positively
- b. negatively
- c. neutrally

4- The monoatomic liquid is

- a. Hg
- b. Ag
- c. Mg
- d. Br

5- The number of electrons that saturates the level (K) is.....

- a.8
- b.2
- c.32

6- Positive charged particles in the nucleus of atom are

- a. neutrons.
- b. protons.
- c. electrons.

7- Potassium is symbolized by

- a. P
- b. K
- c. B

8- The rule which is used to calculate number of electrons that saturate the first four energy levels is

- a. $2^2 n$
- b. $2n^2$
- c. $2n$
- d. n^2

9- When atomic number of an element equals its mass number, this means that there aren'tin the atom of this element.

- a. electrons
- b. protons
- c. neutrons
- d. photons

10-The symbol which represents silver element is.....

- a. S
- b. Si
- c. Au
- d. Ag

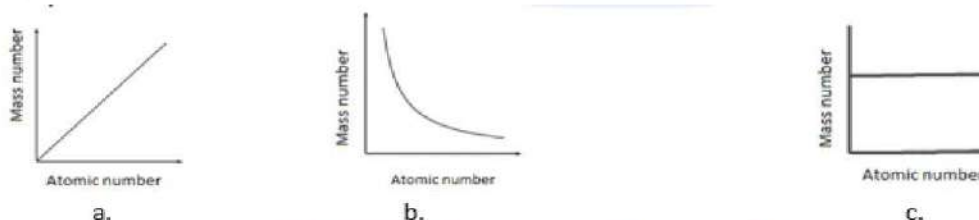
11-The symbol of copper is

- a. C
- b. Co
- c. Cu

12-The outermost energy level of an atom whose atomic number is 12 contains.....electrons.

- a. 2
- b. 8
- c. 10
- d. 12

13-The figure represents the relation between atomic number and mass number.



14-Which statement is true about the proton?

- a. They are positively charged particles outside the nucleus of the atom.
- b. The number of neutrons may be less than the number of electrons.
- c. The number of protons is less than the number of electrons.
- d. As the number of protons changes, the mass of the atom changes and the atom becomes an atom of another element.

15. If the nucleus of the atom contains 11 protons and 12 neutrons, so its mass number is

- a.11
- b.23
- c.1
- d.12

16. The third energy level is saturated withelectrons.

- a.2
- b.10
- c.18
- d.8

17. The nucleus of atom doesn't contain neutrons.

- a. neon
- b. hydrogen
- c. oxygen
- d. helium

▪ **Complete the following statements:**

1. The potential energy of an object depends on and
2. The atom nucleus contains and
3. The symbol of potassium atom is , while the symbol of silver atom is
4. The electrons have charge.
5. Silver symbol is , whereas sulphur symbol is
6. Potassium $_{19}\text{K}$ has electrons in the outermost energy level, but $_{18}\text{Ar}$ has electrons in the outermost energy level .
7. The symbol of the second energy level is
8. The electrons revolve around the in imaginary regions known as

▪ **Write the scientific term:**

1. The sum of the numbers of protons and neutrons inside the nucleus of the atom. (.....)
2. Amount of energy which an electron loses or gains to transfer from an energy level into another one. (.....)
3. Imaginary places in which electrons can move according to their energies. (.....)
4. The number of positive protons in the nucleus. (.....)
5. Electrically neutral particles are found in the nucleus. (.....)

▪ **Correct the underlined words :**

1. The electron can transfer to a higher energy level if it loses energy.
2. Carbon is symbolized by Ca.
3. The atom mass is concentrated inside the electrons.
4. The relation ($2n^2$) is not applied to energy level higher than 5th level.

▪ **Put (✓) or (×) :**

1. Mass number is the sum of protons and electrons numbers. ()
2. Mass number is the number of neutrons in the nucleus. ()
3. Neutrons are found inside the nucleus and carries positive charges. ()

4. Neutrons are particles, which are negatively charged of negligible mass and revolve around the nucleus. ()
5. The third energy level is saturated with 18 electrons. ()

▪ **Give reason :**

The atom is electrically neutral.

.....

▪ **What happens in each of the following cases...?**

1. The nucleus of an atom doesn't contain neutrons.
-

2. An electron gains a quantum of energy.
-

▪ **What is meant by :**

Atomic number.

.....

▪ **Write the symbols of the following:**

1. Oxygen
2. Copper
3. Iron
4. Hydrogen
5. Sodium
6. Carbon
7. Argon.
8. Calcium
9. Aluminum
10. Mercury
11. Zinc
12. Silver

▪ **Mention one difference between :**

The electron and the proton.

▪ **Cross the odd word :**

${}_6\text{C}$ - ${}_{10}\text{Ne}$ - ${}_9\text{F}$ - ${}_7\text{N}$

An atom of chlorine has 17 electrons and 18 neutrons

1. Use these numbers to calculate (a) and (b), then write its symbol correctly as (${}_a^b\text{X}$).
2. What does each of the letters (a) and (b) refer to?

Write the electronic configuration of the following atom:

${}_{11}^{23}\text{Na}$

,

${}_3^7\text{Li}$

,

${}_{18}^{40}\text{Ar}$

,

${}_{10}^{20}\text{He}$

${}_7\text{N}$

,

${}_{17}\text{Cl}$

,

${}_{20}\text{Ca}$

,

${}_{10}\text{Ne}$

Unit 2 (Energy)

Lesson 1 (Energy; Resources and Forms)

Choose the correct answer.

1- The produced energy by burning the fuel isenergy.

- a. potential
- b. nuclear
- c. heat

2- An object of weight 6 newton, moved to a height 5 m, its potential energy isjoules.

- a. 30
- b. 75
- c. 11

3- The Sun is a.....source of energy.

- a. non-renewable
- b. renewable
- c. permanent
- d. all the previous

4- An object of mass 1 kg moves at speed 4 m/s., so it has a kinetic energy =joule.

- a. 16
- b. 8
- c. 64
- d. 4

5-..... is a renewable source of energy.

- a. coal
- b. petrol
- c. wind
- d. natural gas

6- As doubling height to which an object is raised from ground, so the

- a. kinetic energy is increased to its double value.
- b. potential energy is increased to 3 times.
- c. potential energy is increased to its double value.
- d. mechanical energy is increased to 4 times.

7- As an object launched upwards,

- a. its speed decreases.
- b. its speed increases.
- c. its kinetic energy increases gradually.
- d. its potential energy decreases gradually.

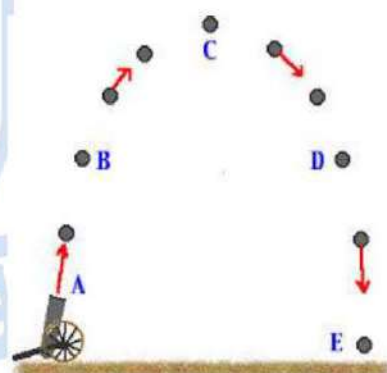
8-In the shown figure:

i)The maximum value of the potential energy is at position

- a. (A)
- b. (B)
- c. (C)
- d. (D)

ii)The mechanical energy is equal to

- a. Kinetic energy at (A) + potential energy at (B)
- b. Kinetic energy at (A) + potential energy at (C)
- c. Kinetic energy at (B) + potential energy at (E)
- d. Kinetic energy at (D) + potential energy at (D)



9- Chemical energy is stored in

- a. stretched spring
- b. car battery
- c. car lamps
- d. pendulum.

10-In the simple pendulum, the potential energy at the maximum height =

- a. kinetic energy
- b. zero
- c. mechanical energy
- d. 10 joules.

▪ **Complete the following statements:**

1. Energy is the ability to do, and its measuring unit is
2. The energy stored in the food is, energy, while.....energy is produced from the dry cell.
3. When an object is launched upwards. its speed
4. When a body raised up, the potential energy, while the kinetic energy
5. An object of mass 2 kg is moving at a speed of 4 m/s has a kinetic energy
6. The potential energy of an object depends on and
7. Potential energy = x
8. If you bounce a basketball on the ground, its speedas it comes closer to the ground, and itenergy decreases.

▪ **Write the scientific term:**

1. Energy stored in the object due to the work done on the object. ()
2. It is the work done during the motion of an object. ()

▪ **Correct the underlined words :**

1. Resource of permanent energy is nuclear energy.
2. Measuring unit of weight is joule.
3. The chemical energy of the object is equal to the sum of the potential and kinetic energies.
4. Wind is a non-renewable source of energy.

▪ **Put (✓) or (x) :**

1. Fuel in a car as food for a man. ()
2. The measuring unit of potential energy is the joule. ()
3. The kinetic energy of a static object equals zero. ()
4. Potential energy of an object decreases by increasing its height. ()
5. Weight = Mass + Acceleration due to gravity.

▪ **Write the mathematical rule used to find: (mention the units)**

1. Work done to move an object from one point to another.
2. Weight.

▪ **What happens when :**

1. The height of an object is doubled (concerning its potential energy).

.....

2. Doubling the weight of an object (concerning its potential energy).

.....

▪ **What is meant by?**

1. Kinetic energy.

.....

2. Potential energy.

.....

▪ **Problems:**

1. Find the weight of an object of potential energy 88 joules when it is found at a height of 11m.

2. A car of mass 50 kg is moving with a speed 5m/s. Calculate its kinetic energy.

3. Calculate the potential energy of an object its weight is 20 N. and placed at 2m. height from the ground.

4. A ball of mass 0.5 kg was launched upwards at a speed 3 m/sec. to a height 4m. Calculate its potential energy and kinetic energy.(knowing that the acceleration due to gravity = 10m/sec^2 .)

5. A ball was thrown vertically upwards at a speed 5 m/sec. to a height 10 m. what is the work done on the ball if its weight is 7 newton and has a mass of 0.5 kg?

Unit 2 (Energy)

Lesson 2 (Energy Transformation)

Choose the correct answer.

1- In car engine the chemical energy is changed into.....energy.

- a. magnetic
- b. electric
- c. mechanical

2- The electric energy is converted into kinetic energy in

- a. electric lamp.
- b. electric fan.
- c. electric heater.

3- Dynamo converts mechanical energy into.....energy.

- a. electric
- b. nuclear
- c. solar

4- The solar heater changes solar energy into.....energy.

- a. chemical
- b. electric
- c. kinetic
- d. heat

5- The electric energy is converted into kinetic energy in

- a. electric lamp.
- b. cellular phone.
- c. electric fan.

6- On doubling the height the potential energy is.....

- a. constant.
- b. doubled.
- c. increased four times.

Complete the following statements.

- 1- In the simple cell,energy changes into.....energy.
- 2- The simple cell consists of.....solution and two different metals.
- 3- Electric energy is converted into kinetic energy in
- 4- The electric circuit contains..... to produce electric energy and to use this electric energy.
- 5- In the dynamo,energy changes into energy.
- 6- If the potential energy of an object is 100 joules and its kinetic energy is 50 joules, its mechanical energy is
- 7- Energy is neitheror....., but it can be converted from one form to another.
- 8- The two metals in the simple electric cell areand
- 9- The simple electric cell, the positive pole is, while the negative pole is

▪ **Write the scientific term:**

1. The sum of potential and kinetic energies of a body. (.....)
2. Energy is neither created nor destroyed but can be transformed into another form.(.....)
3. Pollution produced from the web of cellular phone. (.....)

▪ **Put (✓) or (×) :**

1. The positive pole in a simple cell is lead. ()
2. When the ball of pendulum goes away from its original position, its kinetic energy increases. ()
3. Chemical energy can be stored in stretched spring. ()
4. In the car dynamo electric energy is changed into kinetic energy. ()
5. In the electric cell, the electric energy is converted into chemical energy. ()

▪ **Correct the underlined words :**

1. In simple cell the positive pole is a rode of zinc.
2. The electric fan produces heat energy.
3. Solar batteries change mechanical energy into mechanical energy.

What happens in the following case...?

Overuse of chemical pesticides.

.....

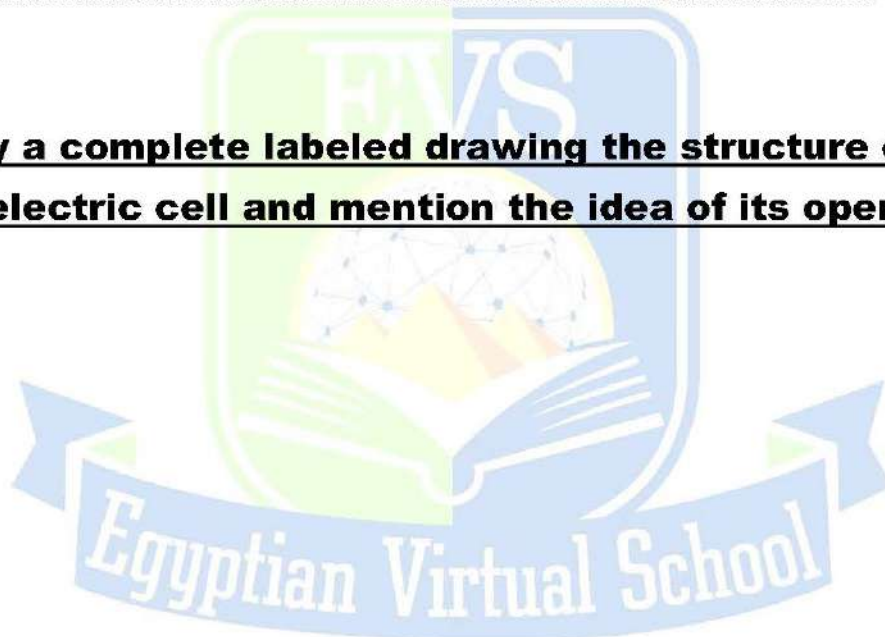
Mention:

Two technological applications, then mention the energy transformation in each one.

.....

.....

Show by a complete labeled drawing the structure of the simple electric cell and mention the idea of its operation.





November Revision

Mr. Ahmed Elbasha

✱ (1) Write the scientific term:

- 1) The way by which the heat is transferred through gases and liquids. (.....)
- 2) The sum of potential energy and kinetic energy. (.....)
- 3) The stored energy in an object due to the work done on it. (.....)
- 4) It is a form of energy which transfers from a higher temperature object to a lower temperature object. (.....)
- 5) The measuring unit of energy (.....)
- 6) Ability to do work or to make a change. (.....)
- 7) The heat state of an object on which the transfer of heat from or to the object depends (.....)
- 8) Energy stored in the object due to the work done on the object. (.....)
- 9) The work done during the motion of an object. (.....)
- 10) It is a permanent resource of energy. (.....)
- 11) The sum of potential and kinetic energies of a body. (.....)
- 12) Energy is neither created nor destroyed, but it is converted from one form to another. (.....)
- 13) A device changes solar energy to electric energy. (.....)
- 14) the transfer of heat from hot object to another without any need for a material medium through which heat transfers. (.....)
- 15) It is the ability to do work or to make a change. (.....)
- 16) Energy stored in the object due to the work done on the object. (.....)

***(2) Choose the right answer:**

1. In solar heater, solar energy is converted into energy.

- a. light b. electric c. heat

2. Chemical energy can be stored in

- a. car battery. b. raising a load up wards.
c. stretched spring. d. car lamps.

3. An object of 20 N. weight and it is placed at a height of 5 m. , so its potential energy is joules.

- a. 50 b. 150 c. 100 d. 200

4. If you sit down beside an electric heater, heat is transferred to you by

- a. convection. b. radiation. c. conduction. d. convection & radiation.

5. Heat transfers from Sun to Earth by

- a. convection. c. conduction.
b. radiation. d. conduction and convection.

6. In car engine, energy of the fuel is changed into heat and mechanical energy.

- a. chemical b. electric c. light d. solar

7. is a permanent source of energy.

- a. Wind b. Fuel c. Food d. The Sun

8. Electric energy is converted into sound energy in

- a. car battery . b. car lamps. c. radio cassette. d. pendulum.

9. Dynamo converts mechanical energy into energy

- a. electrical b. nuclear c. solar d . chemical

10. is a permanent source of energy

- a. Wind b. Coal c. The Sun d . Water

11. The Sun is

- a. resource of permanent energy. b. resource of non-permanent energy.
c. not an energy resource. d . (a) and (c).

12. In the radio cassette inside the car the

- a. electric energy is converted into mechanical energy.
- b. light energy is converted into heat energy.
- c. electric energy is converted into kinetic energy.
- d. electric energy is converted into sound energy.

13. Heat is transferred by convection through

- a. liquids only .
- b. gases only .
- c. solid only.
- d. liquids and gases.

14. Heat transfers through liquids by

- a. conduction.
- b. convection.
- c. radiation.
- d. convection and radiation.

15. Heat transfers from Sun to Earth by

- a. conduction.
- b. convection.
- c. radiation.
- d. no answer.

16. When the object is throw upward the of object decreases.

- a. mass
- b. heat
- c. potential energy
- d. kinetic energy

17. Heat transfer by radiation takes place through

- a. liquids only.
- b. gases only.
- c. material media and nonmaterial ones.
- d. metals only.

18. Heat transfers by through liquid and gas.

- a. conduction
- b. convection
- c. radiation
- d. no correct answer

19. The electric lamp changes the energy into light and heat energy.

- a. sound
- b. electric
- c. mechanical

20. Car engine changes at first chemical energy to energy.

- a. heat
- b. electric
- c. magnetic
- d. light

21. An object of weight 6 newton, moved to a height 5 m, its potential energy is

- a. 30
- b. 75
- c. 11

22. In the solar cell. the solar energy is converted into energy.

- a. kinetic
- b. light
- c. electric
- d. heat

23. Dynamo converts mechanical energy into energy.

- a. electric
- b. nuclear
- c. solar

***(3) Complete the following :**

1. Heat is carried from the electric heater to our body by and
2. Heat is transferred in gases by , while transferred in solids by
3. Kinetic energy increases by increasing and of the object.
4. The networks of wireless transmitters of cellular phones cause pollution but car exhaust causes pollution.
5. Heat is transferred through liquids by , while through space by
6. In the dynamo, energy changes into energy.
7. Heat is transferred through air by and
8. Mechanical energy = +
9. When a body raised up, the potential energy , while the kinetic energy
10. The heat transfers by convection through and materials.
11. In the simple electric cell, energy is converted into energy.
12. The pendulum can convert potential energy into energy.
13. is the way of transferring heat through space.
14. is the sum of potential and kinetic energy
15. In dry electric cell, energy changes into energy.
16. In solar cell, energy changes into energy.
17. The potential energy of an object depends on and
18. When an object is launched upwards. its speed
19. In the simple cell, energy changes into energy.
20. Friction turns kinetic energy into energy.
21. Kinetic energy = $\frac{1}{2} \times \dots \times \dots$

✱(4) **Correct the underlined words:**

1	The solar cell changes the solar energy into <u>heat</u> energy.	(.....)
2	Heat is transferred from the Sun to the Earth by <u>convection</u> .	(.....)
3	<u>Kinetic</u> energy is stored in the object due to a work done on it.	(.....)
4	Measuring unit of weight is <u>joule</u> .	(.....)
5	<u>Electric energy</u> = Potential energy+ Kinetic energy.	(.....)
6	<u>Wind</u> is a permanent source of energy.	(.....)
7	Transfer of heat by <u>conduction</u> does not need a material medium.	(.....)
8	The networks of cellular phone cause <u>noise</u> pollution.	(.....)
9	<u>Copper</u> rode is the negative pole in the simple electric cell .	(.....)
10	The mechanical energy is the sum of <u>heat</u> energy and <u>light</u> energy.	(.....)
11	Heat is transferred through the space by <u>conduction</u> .	(.....)
12	Heat transfers through solids by <u>convection</u> .	(.....)
13	Friction turns the mechanical energy into <u>magnetic</u> energy.	(.....)
14	The kinetic energy <u>decreases</u> by increasing the mass and speed of objects.	(.....)
15	Resource of permanent energy is <u>nuclear energy</u> .	(.....)
16	In solar cell the solar energy is changed into <u>magnetic</u> one.	(.....)
17	In simple cell the positive pole is a rode of <u>zinc</u> .	(.....)

★(5) Give reason for:

1.The motion of the children's swing is like that of the pendulum.

.....

2.Technology has negative effects in the environment.

.....

3.The freezer is found at the top of fridge.

.....

4.Heater is put at the bottom of the room.

.....

5.Solar heater is preferred to gas heater.

.....

★(6) What happen if:

1. An object is thrown upwards.

.....

2. Doubling the weight of an object (concerning its potential energy).

.....

3. Friction of the bicycle wheels to a rough surface.

.....

4. Doubling the height of an object (concerning its potential energy).

.....

5. Dipping two different metals connected by copper wire in an acidic solution.

.....

6. Rubbing your hands together.

.....

*** (7) Put (\checkmark) or (X) :**

- | | |
|---|--------|
| 1. In solar cells, the solar energy is converted into heat energy. | () |
| 2. Temperature is directly proportional to the kinetic energy of particles. | () |
| 3. Work done = Force x Displacement. | () |
| 4. In the electric cell, the electric energy is converted into chemical energy. | () |
| 5. The fuel inside the car is similar to the food inside the body of a living organism. | () |
| 6. Heat is transferred in solid materials by radiation. | () |
| 7. When air is cooled, density decreases, so it falls down. | () |
| 8. In solar cells, the solar energy is converted into heat energy. | () |
| 9. In car lamps, electric energy changes into light energy. | () |
| 10. Heat is transferred through solids by conduction. | () |
| 11. In solar cells, the solar energy is converted into heat energy. | () |
| 12. Friction turns mechanical energy to electric energy. | () |
| 13. The transfer of heat through copper is by conduction. | () |
| 14. Chemical energy can be stored in stretched spring. | () |
| 15. Fuel in a car as food for a man. | () |
| 16. The measuring unit of potential energy is the joule. | () |
| 17. In the car dynamo electric energy is changed into kinetic energy. | () |
| 18. Potential energy of an object decreases by increasing its height. | () |

*** (8) What is the function (use) of ... ?**

1. Simple electric cell.

.....

2. Car dynamo

.....

(9) Problems:*1**

Find the weight of an object its mass 50 kg, knowing that the Earth's gravitational acceleration is 9.8 m/sec^2

2

Draw a diagram to show the simple electric cell.

3

A ball was launched upwards and vertically at a speed 3 m/sec . up to a height 4m.

Calculate the mechanical energy (work done) of the ball if its weight is 5 newton and has a mass of 0.5 Kg.

4

Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Wind generator	a. is a source of nuclear energy.
2. Radio cassette	b. is a source of heat energy.
3. Electric lamp	c. is a source of electric energy.
4. Oven	d. is a source of light energy.
	e. is a source of sound energy.

1.

2.

3.

4.

8

Mr.Ahmed ElBasha

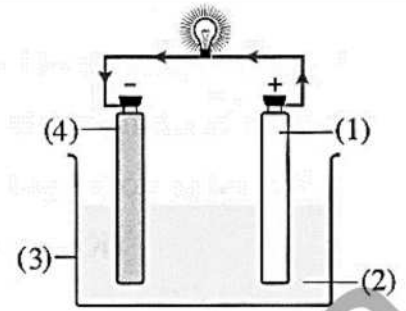
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5

From the opposite figure answer the following questions :

1. Mention the name of the opposite device.
2. Label the fig.
3. Mention the idea of its operation.



6

State the energy transformation in each of the following :

1. Dynamo.
2. Electric lamp.
3. Motor.
4. Electric bell.

7

Calculate the potential energy of an object its weight is 20 N., placed at 5 m height from the ground.

8

Calculate the potential energy of an object of weight 50 newtons that placed at height 5 meters.

Model Answer***(1) Write the scientific term :**

- | | | |
|----------------------|-----------------------|--------------------------------|
| 1. Convection | 7. Temperature | 12. Conservation law of energy |
| 2. Mechanical energy | 8. Potential energy | 13. Solar cell |
| 3. Potential energy | 9. Kinetic energy | 14. Radiation |
| 4. Heat energy | 10. Sun | 15. Energy |
| 5. Joule | 11. Mechanical energy | 16. Potential |
| 6. Energy | | |

***(2) Choose the right answer:**

- | | | | | |
|------|-------|-------|-------|-------|
| 1. C | 6. B | 11. A | 16. D | 21. A |
| 2. A | 7. D | 12. D | 17. C | 22. C |
| 3. C | 8. C | 13. D | 18. B | 23. A |
| 4. D | 9. A | 14. B | 19. B | |
| 5. B | 10. C | 15. C | 20. A | |

***(3) Complete the following :**

- | | | |
|-----------------------------|-------------------------|-------------------------|
| 1. Convection – radiation | 8. Kinetic + potential | 15. Chemical – electric |
| 2. Convection – conduction | 9. Increase – decrease | 16. Solar – electric |
| 3. Mass – speed | 10. Liquid – gas | 17. Weight – height |
| 4. Electromagnet – chemical | 11. Chemical – electric | 18. Decrease |
| 5. Convection – radiation | 12. Kinetic | 19. Chemical – electric |
| 6. Kinetic – electric | 13. Radiation | 20. Heat |
| 7. Convection – radiation | 14. Mechanical energy | 21. $M * V^2$ |

***(4) Correct the underlined words:**

- | | | |
|---------------|-------------------------|--------------|
| 1. Electric | 7. Radiation | 13. Heat |
| 2. Radiation | 8. Electromagnetic | 14. Increase |
| 3. Potential | 9. Zinc | 15. Sun |
| 4. Newton | 10. Kinetic – potential | 16. Electric |
| 5. Mechanical | 11. Radiation | 17. Copper |
| 6. Sun | 12. Conduction | |

***(5) Give reason for:**

- Because in both of them, the potential energy and kinetic energy are interchanged
- Because some of technological applications cause environmental pollution as Electromagnetic pollution, Noise pollution. and Chemical pollution of air, water and soil.
- Because when air is cooled, its density increases, so it falls down to cool the food in the refrigerator (or the room) and the hot air rises up to be cooled again and so on
- Because when air around the heater is heated its density decreases so it rises up to warm the room, while the cold air falls down to be heated again and so on.
- Because solar energy is a clean source of energy which doesn't pollute the environment

***(6) What happen if:**

- Its potential energy increases
- Its potential energy is doubled
- The mechanical energy changes into heat energy by friction
- Its potential energy is doubled.
- An electric current flow through the wire.
- The mechanical energy changes into heat energy by friction

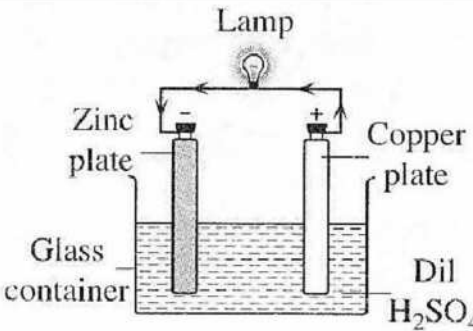
*(7) Put (✓) or (X) :

1. (X)	5. (✓)	9. (✓)	13. (✓)	17. (X)
2. (✓)	6. (X)	10. (✓)	14. (X)	18. (X)
3. (✓)	7. (X)	11. (X)	15. (✓)	
4. (X)	8. (X)	12. (X)	16. (✓)	

*(8) What is the function (use) of ... ?

1. To convert chemical energy into electric energy
2. To convert kinetic energy into electric energy

*(9) Problems :

1	Weight = Mass × Acceleration due to gravity $= 50 \times 9.8 = 490$ newton	6	1. Kinetic energy is transformed to electric energy. 2. Electric energy is transformed to heat and light energies. 3. Electric energy is transformed to kinetic energy. 4. Electric energy is transformed to sound energy.
2		7	Potential energy = Weight × Height $= 20 \times 5 = 100$ joules
3	1. Kinetic energy $= \frac{1}{2} \times \text{Mass} \times (\text{Speed})^2$ $= \frac{1}{2} \times 0.5 \times (3)^2$ $= 2.25$ joule Potential energy = Height × Weight $= 4 \times 5 = 20$ joule Mechanical energy = Potential energy + kinetic energy $= 20 + 2.25 = 22.25$ joule	8	Potential energy = Weight × Height $= 50 \times 5 = 250$ joules
4	1. c 2. e 3. d 4. b		
5	1. Simple electric cell. 2. (1) Copper plate. (2) Dil. sulphuric acid. (3) Glass container. (4) Zinc plate. 3. It converts the chemical energy into electric energy.		

Quiz on lesson 1,2

Q1) give reasons for the following:

1- Some countries try to use wind energy & solar energy as resources of energy

.....

2- When a stone is thrown upward its potential energy increases

.....

.....

3- When the mass of moving increases its kinetic energy increases

.....

4- When the ball of the pendulum reaches the maximum height the kinetic energy equals zero

.....

.....

5-when two different metals connected with a compass are dipped in a lemon the needle of the compass deflect

.....

.....

Q2) complete the following sentence: -

1-is the ability to do work and its measuring unit is

2- We obtain Energy from electric lamps, & Energy from solar cell

3- Kinetic energy increases by increasing And

4- If the speed of a moved object is doubled, its kinetic energy

5- in the simple cell the electric current passes through the wire from plate toplate

6- the simple cell consists of solution dipped in two different

7- When the ball of the pendulum reaches the maximum height, potential energy equalsonly

8- The waves of wireless transmitters of cellular phone causes pollution, while the car exhaust causepollution

Q3) Choose the correct answer: -

- 1-if a man tries to move a car by force equals 6N but the car doesn't move any displacement so the work will be
- a- maximum value b- zero c-work equal to force
- 2-sun and wind are sources of energy
- a-chemical b- kinetic c-electric
- 3- is permanent source of energy
- a-Sun b- moon c- Windows User
- 4- when the height increases 8 times and the weight decreases quarter then the potential energy
- a- increases three times b- decreases double c- increases double
- 5- if the mass of object increases double and the speed decreases half so the K.E will
- a-decreases b- increases c- remains constant
- 6- at maximum height Is vanished
- a- Potential energy b- kinetic energy c- mechanical energy
- 7-as the object falls down
- a- P.E decreases b- K.E increases c-both a & b
- 8-mechanical energy at any point is the sum of
- a- two kinetic energy b- two potential energy c- P.E & K.E

Q3) complete the following table: -

The instrument	Energy used	Energy produced
1- simple cell
2- cellular phone
3- radio cassette
4- electric motor
5-solar cell

Q5) write the scientific terms: -

- 1- The ability to do work or to make a change (.....)
- 2- The work done during the motion of the object (.....).

3- The sum of potential and kinetic energy (.....)

4- Energy is neither creating nor destroyed but it converted from one form to another (.....)

5- The device which is used to convert the chemical E into electric E (.....)

Q6- problems:

a- find the potential energy of an object whose mass is 5kg when it is found at a height of 10 m from the ground?

b- Calculate the speed of a moving body whose mass is 80 kg and kinetic energy is 1000 joules?

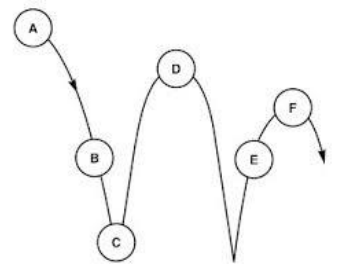
c- from the opposite fig answer the following question:

1- at which position the potential energy is minimum and not equal zero?

a- A & D

b- B & E

c- C & F



2- If the weight is 5N and the distance from C to B 2meter and the distance from E to D is 2 meter and the distance from D to A equals 1.5 meter so the Kinetic energy at B=.....

a-27.5J

b- 17.5J

c-zero

3- potential energy at point C is

a-27.5 J

b- 17.5J

c-zero

Q7) what happen when?

1-falling object from highest position (its mass)

2-over use of chemical pesticides

3-burning fuel inside the car engine

With my best wishes of success

Miss Rabab Mahsoub





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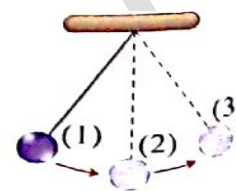
Model exam (1)

1) Complete the following:

- 1) The symbol of sodium is while that of Sulphur is.....
- 2) When an electron transfer from (M) level to (N) itquantum of energy
- 3) in car radio cassette energy changes toenergy
- 4) In simple cell is the positive pole

2) a) Mention each of the following :

- 1) A clean source of energy
- 2) the number of neutrons in $^{23}_{11}\text{Na}$
- 3) a non-renewable source of energy.
- 4) A permanent resource of energy.....



- b)** Form the following fig if the mechanical energy is 50 J find its potential energy and kinetic energy at point (1)

3) Put sign ($\sqrt{}$) or (x) in front of each of the following, then correct the wrong one :-

- 1- When a stone fall down its kinetic energy increase ()
- 2- the outermost energy level of an atom of active elements contain 8 electrons ()
- 3- In nuclear reactor, nuclear energy changes into electric energy ()
- 4- when an atom lose quantum of energy it will be an excited atom ()

(4) Write the electronic configuration for each of the following:

- 1- Calcium $^{40}_{20}\text{Ca}$
- 2- Chlorine $^{35}_{17}\text{Cl}$
- 3- Nitrogen $^{14}_7\text{N}$
- 4- Argon $^{40}_{18}\text{Ar}$

5)A) Cross the odd word out:

- 1) coal - petrol oil - wind movement - natural gas
- 2) Atomic number - protons number - mass number - electrons number.

5)B) Problem: A moving pendulum, its mass 5 kg , its mechanical energy is 200 j and its potential energy at rest position is 50 j calculate. ($g=10 \text{ m/s}^2$)

- a) the height of the pendulum at its rest position from the earth surface
- b) the potential energy at maximum height

.....

.....

.....

.....



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Model exam (2)

1) Complete the following statements

1. the atomic number of a neutral atom has 2 electrons in (L) energy level is
- 2- Protons havecharge while electrons havecharge
3. In photosynthesis process. energy changes intoenergy
- 4- In electric heaterenergy change into

2) Write the scientific term of each of the following:

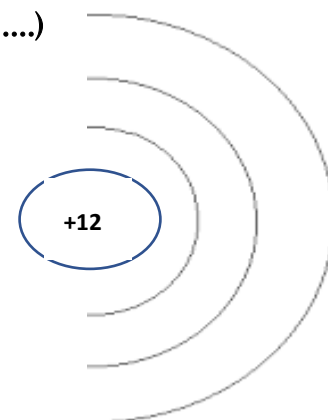
- 1) The ability to do work or to make a change. (.....)
- 2) The fundamental building unit of matter (...)
- 3) Energy is neither created nor destroyed but it is converted from one form another. (.....)
- 4) Imaginary region around the nucleus in which electron move according to their energies. (...)
- 5) the energy stored in body due to work done on it (.....)
- 6) it is the sum. of potential and kinetic energy . (.....)

3) Correct the underline word:

- 1) when the Height increase to double its potential energy increase four times (.....)
- 2) chemical pesticide causes electromagnetic pollution (.....)
- 3) In solar cell the solar energy is changed into magnetic one. . (.....)
- 4) electric energy change into Light energy in sewing machine. (.....)

4) from the figure find:

- 1) Complete the electronic configuration
- 2) Atomic no
- 3) is this element chemically active or not?



5) Write the symbol of each of the followings

- 1- Sulphur
- 2- Iron
- 3- potassium

6) Give reason for each of the following

- 1- When the pendulum reaches to max. height the potential energy equal the mechanical energy
.....
- 2- Some countries use wind energy and solar energy as a resource of energy .
.....



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Model exam (3)

1) Choose the correct answer from each of the following:

1- Which of the following devices pollutes the environment?

- a-gas oven b-electric oven c- electric heater d- solar heater

2- Chemical energy can be stored in

- a-stretched spring b- car battery c- a person on a mountain d- car lamp

3- A body of mass 2 kg move with speed 4 m/s calculate its kinetic energy.

- a-4 J b- 16 J c-12 J d- 32 J

4- In car engine chemical energy change intoenergy

- a-electric b-potential c- kinetic d-sound

2) Correct the underlined word:

1) Water movement is a permanent source of energy.

2) The nucleus of the atom is negatively charged.

3) lamp produces sound energy.

4) In electric iron electric energy change into sound energy

5) The chemical symbol of potassium Pt.

6) The fourth energy level (N) is saturated with 8 electrons

3) Find the potential energy of an object of weight 10 newton when it is found at height of 12 m.....

4) a) Cross the odd word out:

1) potential energy - chemical energy - kinetic energy - mechanical energy .

2) Sodium - Oxygen - Helium - magnesium

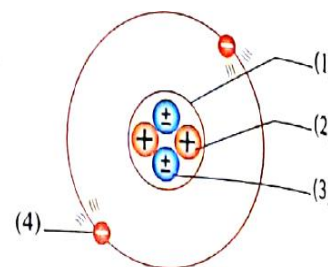
b) from the opposite fig. answer the following

label the fig. 1-..... 2-..... 3-..... 4-.....

5) Give reason for:

1- No change in potential energy when the object moves horizontally

2- Atom is electrically neutral.





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Model exam (4)

1) Complete the following statements:

- 1-energy level has the highest energy
- 2) In the dynamo..... energy changes intoenergy!
- 3) Loud speakers and drilling machines causespollution
- 4) Joule = x meter
- 5) The measuring unit of work is....., while the measuring unit of weight is.....
- 6) $K.E = \frac{1}{2} \times \dots \times \dots$

2) Choose from column B what suits column A

A	B
1) In simple call the positive pole is a rode of	a. Kinetic
2) Electric fan change electric energy into	b- Chemical .
3) energy stored in plants by photosynthesis process	C- Heat
4) In gas stove chemical energy change into	d - Copper

3) Write the scientific term for each of the following: -

- 1- The atom that gains a quantum of energy. ()
- 2- the work done due to the motion of an object ()
- 3- Energy is neither created nor destroyed, but it is converted from one form to another.()
- 4-The amount of energy that gained or lost by an electron when it transfer form one energy level to another ()

4) What is meant by:

- 1) the atomic number of calcium =20.....
- 2) the mechanical energy of body = 100 j.....

5) Show by drawing the electronic configuration of each of following elements:



- 6) Calculate the kinetic energy of a body its weight 48 N that moves with a speed 4 m/sec. knowing that the gravitational acceleration is 9.8 m/s² ?

.....

.....

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Model exam (5)

Choose the correct answer:

1- from the fig. the maximum potential energy at point

- (a) 1 (b) 2 (c) 3 (d) 4

2- the energy of level (L) is higher thanenergy level.

- (a) K (b) M (c) N (d) O

3-An object of mass 50 kg is moving at speed of 2 m/s has a K.E= J

- (a) 100 (b) 50 (c) 200 (d) 25

4-.....causes massive destruction

- (a) chemical pesticide (b) mobile phone (c) loud speakers (d) nuclear weapon

5- In the simple pendulum, the kinetic energy at maximum height equals...

- (a) zero (b) potential energy (c) mechanical energy (d) electric energy

6- mass number is the number of

- (a) Protons (b) neutrons (c) protons x neutron (d) protons + neutron

2) Calculate the potential energy of an object its weight is 20N, places at 5m height from the ground.....

b- From the opposite figure, answer the following:

1) Mention the name of the device.....

2) Label the figure. 1-..... 2-.....

3) Complete: it converts energy into energy.

3) From the following fig.

-Four balls at the same height from sand ,the Depth that occurs by the balls when they fall Down is recorded in the table below

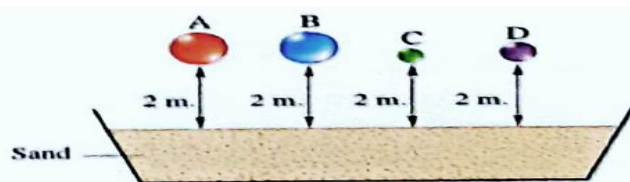
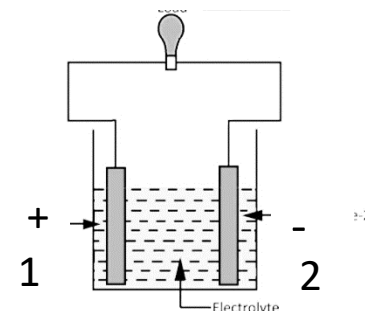
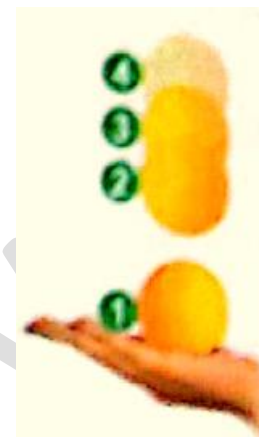
a) Which ball store less energy ?

b) Which two balls have the same masses?

4) Give reason for:

1) The mass of atom is concentrated in the nucleus.

2) Helium is inactive element



Ball	A	B	C	D
The depth of the print in sand :	12 cm.	5 cm.	8 cm.	12 cm.



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Model exam (6)

1) Choose the correct answer:

- 1) Negative charged particles with negligible mass...
(electrons - protons - nucleus - neutrons)
- 2) If the speed of an object motion increase into double, its kinetic energy
(Zero - doubled - increased four times)
- 3) The number of energy levels in the heaviest atom =
(1 - 3 - 5 - 7)
- 4) The atomic number for an atoms that has 3 electrons in the third energy level is
(3 - 5 - 13 - 15)

2) Mention the type of energy in these examples :

- 1- A body at the top of mountain
- 2- a compressed spring
- 3- a moving bicycle
- 4- inside food

3) problem : A moving pendulum has a potential energy of 0.8 joule at maximum height

If the mass of its ball is 0.08 kg and acceleration due to gravity 10 m/s^2

Calculate: -

The height of the pendulum

4) Mention one difference between:

- 1) The electron and the proton.
.....
- 2) Neon atom and Oxygen atom
.....

5) Mention one example of:

- 1) A device changes solar energy into heat energy.
.....
- 2) body exert force but there is no work done
.....



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Model answer (model 1)

- 1}
- 1- Na - S
- 2- Gain
- 3- electric - sound
- 4- copper
- 2} a) 1- sun
- 2- 12
- 3- Coal - petrol oil
- 4- sun
- B) P.E is maximum = 50 j K.E = zero
- 3} 1- $\sqrt{\quad}$ 2-x inactive 3- $\sqrt{\quad}$ 4-x gain
- 4} 1- 2,8,8,2 2- 2,8,7 3- 2,5 4- 2,8,8
- 5} 1- wind movement 2- mass number
- B) a) $W = m \times 10 = 5 \times 10 = 50 \text{ J}$
- $h = P.E / W = 50 / 50 = 1 \text{ m}$
- b) P.E at max. height = Mechanical energy = 200 j

Model answer (model 2)

- 1}
- 1- 4
- 2- positive - negative
- 3- light - chemical
- 4- electric - heat
- 2} 1- energy 2- atom 3- law of conversation of energy 4- energy level
- 5 - potential 6- mechanical
- 3} 1- double 2- chemical 3- electric 4- kineti
- 4} 1- 2,8,2 2- 12 3- active
- 5} 1- S 2- Fe 3-K
- 6} 1- Bec. Kinetic energy equal zero
- 2- Bec. They are clean and cheap source of energy



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Model answer (model 3)

1}

1- a 2- b 3- d 4- c

2} 1- renewable 2- positively 3- light 4- radio 5- K 6- 32

3} $P.E = wxh = 10 \times 12 = 120 \text{ j}$

4} a) 1- chemical 2- Helium

b) 1- nucleus 2- protons 3- neutrons 4- electrons

5} 1- Bec. Potential energy depends on the height of body and the height doesn't change

2- Bec. The number of positive protons equal the number of negative electrons

Model answer (model 4)

1}

1- Q

2- kinetic (mechanical) - electric

3- Noise

4- Newton

5- J - N

6- Mass - V^2

2} 1- d 2- a 3- b 4- c

3} 1- excited atom 2- K.E 3- Law of conservation of energy 4- Quantum

4} 1- means that the number of protons or the number of electrons = 20

2- the sum. Of potential and kinetic energy = 200 j

5} 1- 2,8,3 2- 2,8, 3- 2,8,6 4- 2,8,7

6} $\text{mass} = W/9.8 = 48/9.8 = 4.89 \text{ kg}$ $K.E = \frac{1}{2} mv^2 = \frac{1}{2} \times 4.89 \times 4^2 = 39 \text{ J}$



November model exams 1st Prep.

Model answer (model 5)

1}

- 1- d (4) 2- a (K) 3- a (100 j) 4- d (nuclear weapon) 5- c (mechanical
6- d (protons+ neutrons)

2} a) $P.E = WXh = 20 \times 5 = 100 \text{ J}$

- b) 1- simple cell - 2- copper 3- zinc - 4- chemical to electric

3} 1- B

2- A , D

4} 1- because the mass of electrons outside the nucleus can be neglected compared to the mass of protons and neutrons inside the nucleus

2- Bec. The last energy level is completely filled with electrons

Model answer (model 6)

1}

- 1- electron 2- increased four times 3- 7 4- 13

2}

- 1- Potential energy - 2- Potential energy 3- Kinetic energy - 4- chemical energy

3} $w = mx10 = 0.08 \times 10 = 80 \text{ N}$

$h = P.E / W = 0.8 / 80 = 0.01 \text{ m}$

4} 1- **electron** : negative charged - outside the nucleus

Proton : positively charged - inside the nucleus

2- **Neon** : inert gas - monoatomic inactive

Oxygen : : active gas - diatomic

5} 1- solar heater

2- a boy carry a bag and stand don't move